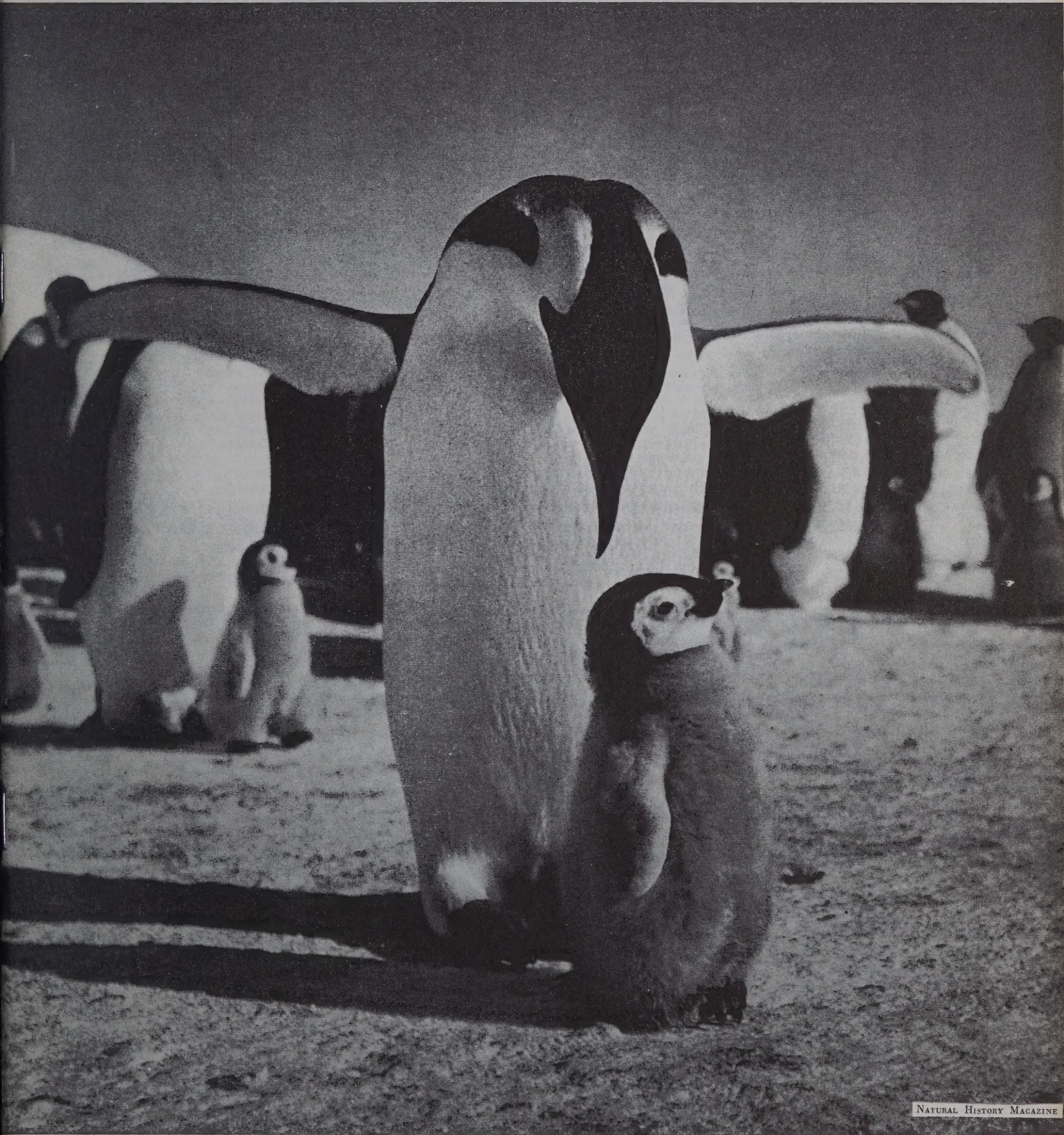


THE POLAR TIMES

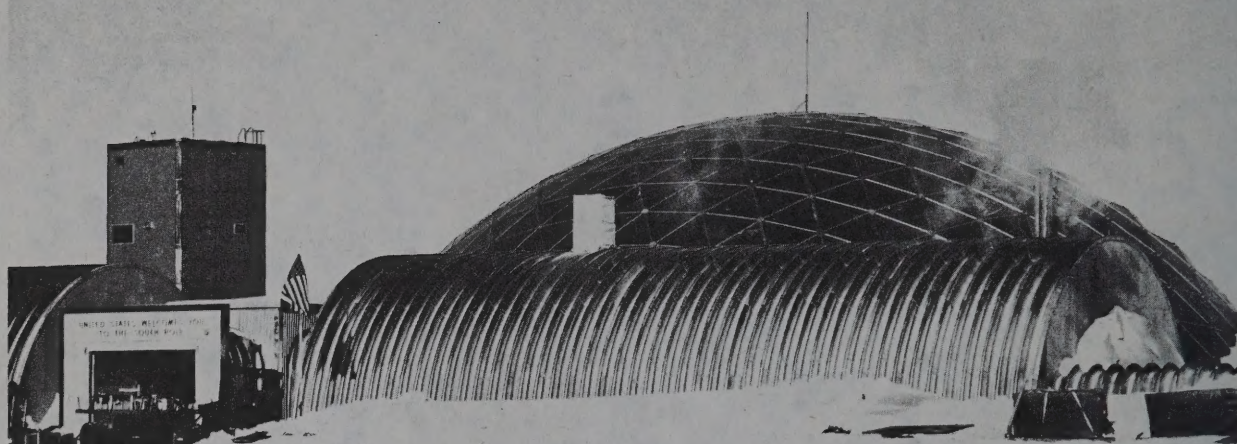


NATURAL HISTORY MAGAZINE

MATURING EMPEROR is now able to walk about on its own. Young bird still remains by parents, however, dependent on

them for food and too weak to cope with the rugged terrain. Molting has not yet begun—the chick still wears fuzzy down.

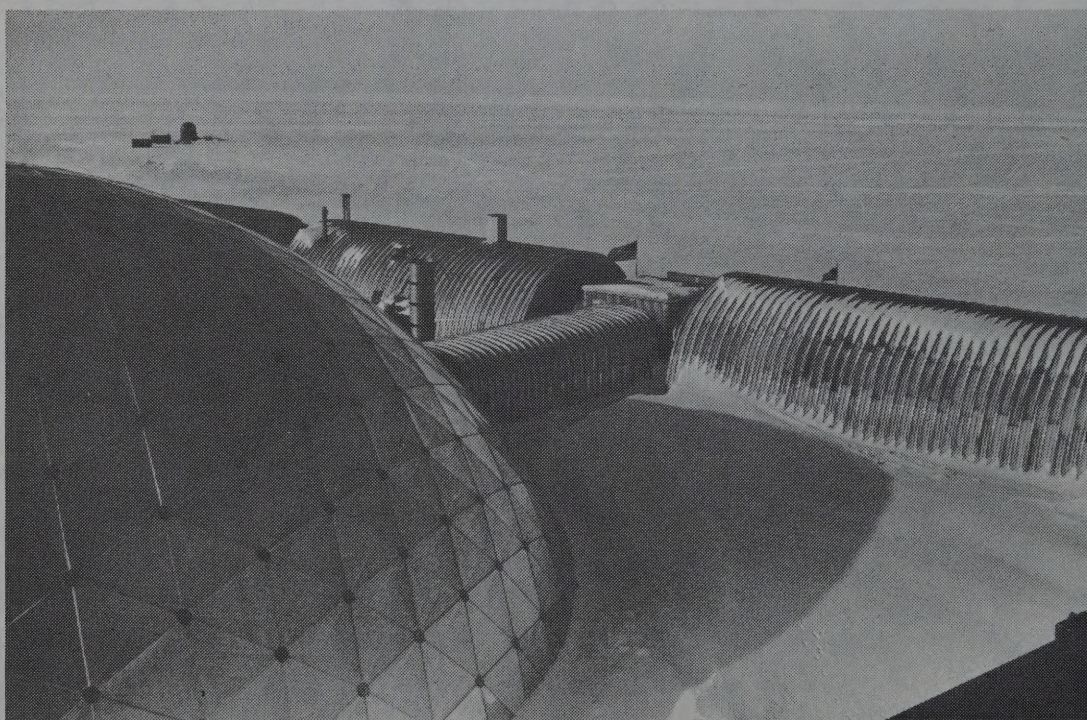
A new research station at the South Pole



U.S. Navy

You can see the 16-meter-high aluminum geodesic dome a full half-hour before the ski-equipped Hercules airplane lands. Then the semicircular steel arch comes into view: 14 meters wide, 24 meters long. The plane taxis to roughly the mid-point of the arch, opposite the

geodesic dome, where a large wooden double door stands open. Over the door, in neat red letters on a white background, is a sign: UNITED STATES WELCOMES YOU TO THE SOUTH POLE.



NATIONAL SCIENCE FOUNDATION

ALUMINUM BUBBLE rises above a half-cylinder of corrugated steel on a flat snow plain extending for hundreds of miles. Center of the United States' new Amundsen-Scott South Pole

Station, the geodesic dome, measuring 164 feet in diameter and 52 feet high, houses three two-story buildings. The 46-foot diameter half-cylinder, with its links, extends more than 800 feet.

The Polar Times

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No. 80

JUNE 1975

RESOURCE STUDY IN ANTARCTIC SET

12 Nations Active in Region
Agree to Weigh Problem
of Exploiting Minerals

By WALTER SULLIVAN

The New York Times

June 29 —

Fifteen and a half years after the 12 nations active in Antarctica signed a treaty setting aside that continent as an international laboratory they have confronted their first substantive issue of contention: exploitation of the region's mineral resources.

In a two-week meeting that ended June 20 in Oslo, Norway, they agreed to international consideration of the problem, though not necessarily international control of the resources.

Considering the wide range of political motivations involved, including overlapping territorial claims by three participants, Argentina, Britain and Chile, the extent of agreement is considered encouraging by the American representatives.

Some, in fact, regard the meeting as a landmark that bodes well for survival of the Antarctic Treaty, which they feared might founder on this issue. The treaty was signed by the 12 nations in 1959 following cooperative research during the International Geophysical Year.

The treaty has no provision permitting or restraining exploitation of the region's resources. Nor does it endorse or challenge the territorial claims of some of its signatories.

Instead it provides freedom of access for all. It outlaws military activity and nuclear dumping and provides for on-site inspection to verify compliance.

Those signing included the United States and the Soviet Union, both of whom recognize no one else's claims and reserve the right to make their own. Pie slices, converging at the South Pole, have been claimed by seven other signatories: Argentina, Australia, Britain, Chile, France, New Zealand and Norway. The other adherents

Temperature at South Pole—100deg F

June

Scientists and support staff wintering at the South Pole had the coldest May for 18 years.

On Tuesday last week a minimum temperature of -100deg F was recorded. This was the coldest May temperature recorded in the 18 years since man's first wintering over at the Pole.

The 17 civilians have spent six months at the base in buildings under a geodesic dome.

are Belgium, Japan and South Africa.

When the treaty was signed the possibility of exploiting Antarctic resources seemed remote. While the South Polar Plateau appears to be underlain by coal fields, they are too inaccessible to compete with those in more temperate lands.

A vein of manganese ore had been found on the coast of Wilkes Land and it was assumed that Antarctica must have extensive mineral resources. But with most of the continent buried under ice and its coasts difficult of access, economic exploitation of such deposits seemed far off.

Now, however, the drill ship Glomar Challenger has found evidence of oil and gas beneath the Ross Sea. Manganese nodules may carpet some of the coastal sea floor and those waters are rich in the tiny shrimp known as krill. The latter are the chief food of the giant blue whales whose decline, through intensive whaling, has allowed the volume of krill to increase.

The United States delegation to the Oslo talks was led by Dr. Robert E. Hughes, who now heads the international programs division of the National Science Foundation. Until recently, he was professor of chemistry at Cornell University.

The meeting was the eighth consultative conference to be held under provisions of the 1959 treaty. A number of participants consider it the most important to date.

In a telephone interview, Dr. Hughes said no binding agreements with regard to Antarctic

Hunting of Finback Whale Cut to Assure Its Survival

By JULES ARBOSE

The New York Times

LONDON, June 27—The finback whale, biggest of the whales still hunted legally, was given almost total protection by the International Whaling Commission today. Catch quotas on other species of whales were also drastically reduced.

The measures, taken at the

commission's annual meeting this week in London, were described as "historic" by Inge Rindal, the commission's Norwegian chairman. "They're the sharpest cuts we've ever had in quotas," he said, "effectively reducing next season's total whale catch by 10,000—from 37,000 to 27,000."

Comment on the reductions from the two great whaling nations—Japan and the Soviet Union—was not forthcoming. However, Mr. Rindal was complimentary toward both nations, which in the past had obstructed conservation efforts by the commission. "Both the Soviet and Japanese went along with most of the new quotas, while abstaining on others," he said, adding that he didn't think they would be lodging objections.

Under the rules of the commission, nations need only lodge objections to decisions within 90 days not to be bound by them.

The cuts were made under new management procedures regarding whale stocks. These procedures were adopted by the commission last year. They allow selective moratoriums to be placed on the commercial whaling of any species falling below a level considered necessary for survival.

First to benefit from the selective moratorium was the finback, second only in size to the totally protected blue whale. A ban was placed on hunting the finback, which grows to a maximum of 82 feet and weighs 70 tons, in the North Pacific,

and only 585 can be caught during the 1975-76 season in the Southern Hemisphere and North Atlantic. Last season's finback catch quota was 1,550.

Similar cuts in quotas, which for the last three years have been 3,000 or so above actual recorded catches, were made on

resources had been made. Rather the conference, after "reluctance" by some participants, manifested a consensus as to the need for an international approach.

To Meet Next Summer

Specifically it was agreed, in anticipation of further action at the next conference in London two years hence, to hold a three-week preparatory meeting in Paris in the summer of 1976. This will consider all aspects of the mineral resources problem: exploration as well as the juridical, economic and political considerations relating to exploitation.

The United States will be host at another meeting at roughly the same time to discuss the living resources of Antarctica, including those of the sea. However it is to be a conference of experts rather than of government representatives.

The Antarctic Treaty was considered a turning point in the development of international relations. It set the stage for a United Nations agreement outlawing the military use of celestial bodies such as the moon. However increasing demands for food, fuel and other resources have been seen as a growing threat to the delicate balance of national interests represented by the treaty.

Suppose, one American official suggested last week, a rich oil deposit were found in the zone claimed by Argentina, Britain and Chile before machinery has been created to deal with such a situation. "We would have a disaster on our hands," he said.

He felt the Oslo talks had made such a crisis somewhat less probable.

the other four whales still hunted commercially—the sei, sperm, Minke and Brydes.

While falling short of the United States' perennial call for a 10-year moratorium on whaling, which was allowed to lie dormant at the conference this year, American delegates appeared to be happy with the results. Robert White, the chief delegate, said the reductions represented "a major step forward in the international effort to protect all species of whales from endangerment in the future."

Unlike previous meetings of the commission, this week's in Millbank on the north bank of the Thames appeared to be marked by each side's appreciation of the other's problems.

"It's finally dawned on the conservationists that the whaling fleets can't be scrapped just like that, and on the whalers that some species really are in danger of extinction," said an American delegate. "That's made it easier for both sides to make accommodations and for the commission to get down to its business of rational management of whaling stocks."

There are 15 members of the commission. They are Argentina, Canada, France, Mexico, Panama, Britain, the United States, Australia, Brazil, Denmark, Iceland, Japan, Norway, South Africa and the Soviet Union. Only the last eight engage in whaling and two of them, the Soviet Union and Japan, between them account for 80 per cent of the total whale catch.

Six other whaling nations—Somalia, Chile, South Korea, Peru, Portugal and Spain—are not members of the commission. They account for 6 per cent of the whale catch.

The commission was formed

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AUGUST HOWARD, Editor

THE POLAR TIMES highly recommends "The Polar Record," published by the Scott Polar Research Institute, Cambridge, England.

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St. VINCENT 10¢



St. VINCENT 12¢



ST. VINCENT WHALES

TWO species of whales, the Sperm and the Humpback, can be considered among the most cosmopolitan animals in the world. Both species are found in all oceans of the globe, including both polar seas.

under an international convention in 1946 to provide "for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry."

For a long time it was accused of being a rubber stamp for the industry, setting quotas that divided the annual catch among whaling nations with little thought given to conserving stocks. Not until 1963 were the first quota reductions imposed and four years later bans were placed on the blue and humpback, which joined the right and gray as totally protected species.

The decimation of the blue whale is cited by conservationist groups such as The Friends of the Earth as an example of what they see as the commis-

sion's deficiencies. The species now totals 8,000, or about 10 per cent of its population 30 years ago. Experts agree that it will take a century to rebuild stocks to harvestable levels, if indeed, the species survives. Many believe it won't.

The worldwide attention to conservation in the nineteen-seventies emboldened the commission to take its first timid steps in making survival of the whale its first priority. For three years, 1972 to 1974, the United States called for a 10-year moratorium on whaling.

While unsuccessful each time in mustering the three-quarters majority required for approval, the resolution tended to soften opposition to a conservation-oriented commission and enabled conservationists to push through drastically slashed quotas.

Japan's Whalers Hit Hard By Cut in Hunting Quotas

The New York Times

TOKYO, June 28—The Japanese whaling industry was deeply shocked by the decision of the International Whaling Commission in London to cut whale quotas and will apparently be forced to drastically reduce its operations.

Major Japanese fishing companies are reportedly planning to reduce or merge their whaling departments, cut down their fleets of whalers and switch surplus crew member to other duties.

Japan, along with the Soviet Union, is one of the two remaining major whaling nations. The Japanese whaling industry alone last year accounted for 38 per cent of the total world catch quota of 37,300 whales.

Despite the rise of antiwhaling sentiment in the United States and elsewhere in recent years, most Japanese have tended to look on whaling as an important national industry for this land of scanty resources.

In defense of its continued whaling, the Japanese whaling industry points out that whale meat has been an important source of protein for the Japanese people.

Toshio Futami, a member of the central executive committee of the All-Japan Seamen's Union, said that "the decision made by the International Whaling Commission was strongly political in coloring."

He said that his union had sent telegrams to the committee chairman in London urging him to make a decision on catch quotas by "scientific evaluation and by taking into account the eating habits of the Japanese people and the livelihood of crew members of whaling ships."

A spokesman for the whaling industry here said that three whaling companies, Nippon Hoge, Nitto Hoge and Kokuyo Hoge, will merge into one company by next spring.

In anticipation of a sharp reduction in Japan's whale

catch, the price of whale meat has already risen 38 per cent this month over June last year.

Whale meat now is almost the price of pork.

Moriyuki Kato, director of the school lunch section of the Education Ministry, said that the ministry was considering using fish meat, sausage and hamburger in school lunches in place of whale meat. The total amount of whale meat served in school lunches each year is about 7,000 tons.

A spokesman for the Whale Bacon Producer's Association, composed of 26 whale meat processing companies, said that they would maintain the present production level by importing whale meat.

Rikio Soma, owner of the whale meat restaurant Kujiraya in Tokyo, said that he would have to increase prices of dishes served at the restaurant because the price of whale meat was sure to rise further.

Coast Guard Boat Kills Gray Whale

SAN DIEGO (UPI) — A Coast Guard hydrofoil boat, speeding through the ocean at nearly 50 miles an hour, struck and killed a whale, the Coast Guard said.

The boat collided with the 30-foot gray whale south of San Diego Bay in less than 50 feet of water.

The boat, carrying 10 men, sustained considerable damage.

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Soviet Plans New Station On Shores of Antarctica

By MALCOLM W. BROWNE

The New York Times

MOSCOW, June 28—The Soviet Union plans to establish a new, 50-man station in Antarctica, mainly to prospect for mineral resources.

Plans for the new station were announced by Tass, the Soviet press agency, following an agreement by the 12 nations active in Antarctica to study the problems associated with resource use. The 1959 Antarctic Treaty providing international access to the continent avoided the resource issue.

Since then the developed nations, especially the Soviet Union, the United States and Japan, have expressed growing interest in the development of Antarctic resources, particularly in view of oil and gas resources believed to exist under the continental shelf.

The Trans-Antarctic Mountains, an extension of the Andes of South America, are known to be rich in copper and other minerals.

The main American base in Antarctica, McMurdo, is at the edge of the Ross Ice Shelf at one end of the Trans-Antarctic range, ideally situated for prospecting.

Base Named Druzhnaya

According to the Tass announcement, the new base, to be named Druzhnaya (Amity), will be built at the northern edge of the Filchner Ice Shelf, which extends into the Weddell Sea. The base will be established in the next Antarctic summer season, which is winter in the Northern Hemisphere.

The head of the new project was identified as Garik Grikurov, who will lead a team of geologists, geophysicists and cartographers.

Their work, which is to extend over a five-year period, will cover a region extending from the Antarctic Peninsula to Queen Maud Land.

Neither the United States nor the Soviet Union recognizes any nation's territorial claims in Antarctica and scientists of the two nations work cooperatively. However, the staking out of a Soviet base west of the continental mountain range is something new.

The Soviet Union's present bases are in East Antarctica, the coldest part of the continent, nearly all of which is covered with ice up to three miles thick. The Americans have tended to concentrate their stations in areas in which



The New York Times/June 29, 1975

mineral exploitation would be more practical

The Soviet announcement today clearly indicated Moscow's interest in minerals in the area around the projected base.

"The eastern part of this region has many common features with South Africa. The south is reminiscent of the ore-bearing zones of Siberia, while the west is a continuation of the South American mountains, famous for their deposits of nonferrous minerals," the statement said.

"The most extensive region of the continental shelf in Antarctica, a potential natural storehouse of oil and gas, extends across the Weddell Sea and the Filchner Ice Shelf."

Geologists and other scientists have taken pains so far to avoid any exploitation or any accidental disruption of ecological systems as the result, for example, of oil drilling.

Women to be in on Antarctic probes

Canberra

Australia is to let women take part in future Antarctic expeditions as a contribution to International Women's Year.

Science Minister Bill Morrison told Parliament that accommodation and other facilities were to be improved, especially for women, at Australia's permanent research base on Macquarie Island, 1,000 miles southeast of Tasmania.



USS Glacier, which was locked in ice of Weddell Sea, Antarctica.

Icebreaker Batters Free in Antarctica And Heads for U.S.

LONG BEACH, Calif., March 11 (AP)—The 309-foot icebreaker Glacier headed home today after battering her way out of a South Pole icepack where she had been trapped for nine days.

Capt. Richard Gilette, radioed last night to Coast Guard headquarters here that his ship, the biggest and most powerful icebreaker in the United States fleet, had reached open water after hammering through the final 1½ miles of 25-foot ice in the Weddell Sea.

The Glacier had become trapped in ice when the blades of one of her two propellers sheared off. The Glacier was on her way to the rescue of the Argentine icebreaker, Gen. San Martin, caught in the huge ice floes after engine trouble.

The second propeller was enough to power the Glacier out of the ice pack, Captain Gilette said on the radio. Winds gave the ship an assist by breaking up some of the ice.

Before ramming her way in what the ship said was "heavy going" through the final 1½ miles of ice, the Glacier had traveled 2½ miles northward through extremely hard old ice mixed with thinner first-year ice.

Another United States icebreaker, the Burton Island, has been standing by in open sea. The Coast Guard said the Burton Island would remain in the area with the San Martin.

American officials fear the trapped Argentine ship may not be freed because the Southern Hemisphere winter is approaching rapidly.

The Coast Guard said that

Big Antarctic Oil Field Is Possible, Navy Says

HONOLULU, Feb. 28 (UPI)—The Navy has disclosed the possible existence of an offshore Antarctic oil field that might be larger than Alaska's gigantic North Slope discovery.

Capt. Eugene E. Van Reeth, commander of the Navy's Antarctic support force, said yesterday that various geologists working in the Antarctic had surmised that the continental shelf off Marie Byrd Land "could have up to 45 billion barrels of oil." But he added, "This is, of course, just an estimate and something on which we can only speculate."

He said at a news conference here that various geologists working in the Antarctic had concurred on the possibility of oil, but that none had yet made a serious attempt to verify the 45-billion estimate.

The Glacier would probably dock at Ushuaia on the southern tip of Argentina by Thursday, then proceed home to Long Beach, probably making stops on the way to permit shore leave.

Aboard the Glacier, and in good condition, were 138 of the ship's 211 crew members

DON SHELDON

Anchorage, Alaska, Jan. 26 (Special)—Bush pilot Don Sheldon, 53, whose rescues and wilderness mapping missions spanned half of that lifetime, died today. He was the primary support pilot for climbing expeditions at Mount McKinley, North America's highest peak. His exploits included the rescue of seven climbers in 1963 and the saving of three airmen survivors aboard a crashed Air Force C-47 in a blinding snowstorm in 1954.

Professor Tells Discovery Of New Antarctic Current

By ELDON BARRETT

TACOMA, Wash. (UPI) — At a time when most geographical discoveries are being made in outer space, a young college professor has found a heretofore unknown ocean current in the waters near Antarctica.

Evidence of the current in the "Southern" ocean was discovered by Dr. Richard McGinnis, who teaches biology at Pacific Lutheran University here.

McGinnis doesn't take full credit for the discovery. He points out that the existence of the current was suggested in 1937 by a noted Antarctic research scientist in England, Sir George Deacon. However, a remark Sir George made in a publication concerning the current evidently went unnoticed by subsequent authors.

McGinnis noticed it and he suggests the current be named after the Englishman.

McGinnis says the current is unusual in that it flows in a westward direction, counter-clockwise to the prevailing currents in the sub-Antarctic Ocean waters.

The young professor bases his published conclusions on two primary factors. The first has to do with the degree of salt content in the waters.

"The core layers of high and low salinity are flowing in opposite directions, the more saline southern water to the east and the more diluted northern water to the west," he

said in an interview. "Each is mixing with adjacent waters."

The second factor, the one that initially led to his discovery, involves the distribution of a number of lantern fish species in the "Southern" ocean.

Lantern fish, a luminescent type of fish that produces its own light, has been McGinnis' research specialty for nearly 10 years.

He is a 1963 Pacific Lutheran graduate, but he earned his doctorate at the University of Southern California where his thesis dealt with the distribution of lantern fish in the waters near Antarctica. His research at that time established the existence of 16 new fish species there.

McGinnis' calculations regarding distribution of lantern fish are detailed and involved, but his conclusions indicate that their distribution "would be difficult to explain if, as widely accepted, the dominant flow of water in specified sectors was eastward rather than westward, as in the case of the 'Deacon' current."

McGinnis' ultimate concern is the application to fossil records of findings relating to fish distribution and ocean currents.

"In this fashion we can partially reconstruct what happened in the open ocean during the past 60 million years," he said.

Scientists Say Nature May Cause Pollution

RICHLAND, Wash. (AP) — Nature, not man, may be the source of some marine animal pollution, two scientists say.

David E. Robertson and Dr. Louis A. Rancitelli, scientists at Battelle's Pacific Northwest Laboratories here, say that some of the toxic metals found in animal tissue may have been around for centuries.

"The high levels of mercury, cadmium and selenium which we earlier discovered in modern Antarctic animal tissue samples may not be the result of man's pollution," Robertson said.

In an upcoming research program, the scientists say they will study levels of the toxic metals in animal tissues from modern Antarctic animals. They also plan to study tissue from centuries-old seals which have been found trapped inland and preserved frozen in dry areas of Antarctica, Robertson said.

Robertson says deep sea water samples explain the high levels of toxic metallic and chemical elements in the ancient animal tissue.

"We found high mercury levels in the Atlantic at various depths and locations where we wouldn't expect man-made pollution, and in concentrations hundreds of times higher than could be caused by currently understood pollution processes," he said.

The samples were taken near the Mid-Atlantic Ridge, an underwater mountain range which many geologists feel is still oozing magma. Robertson's theory is that the magma, cooling molten rock,

contains mercury and other elements.

"Submarine volcanism could supply enormous quantities of heavy metals to the oceans where it may be accumulated by marine organisms," he said.

Robertson said scientists also plan to study the inter-relationship of mercury, cadmium and selenium.

FRAGMENTS FOUND OF 6-FOOT PENGUIN

COLUMBUS, Ohio (AP) — An Ohio State University scientist has returned from the South Pole with fossil fragments of an extinct giant 6-foot-tall penguin.

Dr. William J. Zinsmeister's 2½-month investigation at Seymour Island in the Antarctic peninsula also turned up fossils of a broadleaf tree characteristic of temperate climates and many new species of snails and mollusks.

"We are attempting to correlate the new species we found with similar ones in other southern continents," Dr. Zinsmeister said.

The fossil of the 6-foot penguin was unusual because of its size; extant penguins range from one to 3½ feet tall. He said the snail and mollusk fossils belonged to a biological province about 55 million years old and supported geological theories that New Zealand was once linked with the Antarctic.

"We think they are more closely related to New Zealand and Tierra del Fuego, off South America's tip, than to southern Argentina," he said.

Dr. Zinsmeister said the find gives us a new perspective on the relationships of the land mass in this area, the site of complex plate movements of the earth, when New Zealand moved away from Antarctica."

The polar scientist said the fossils reinforced other geological evidence linking the land areas, which at that time lay closer to the equator—about 20 degrees north of Seymour Island's present site in a warmer latitude.

"The reason we found so many new mollusk species is probably that the Antarctic peninsula was virtually unworked for fossils before," he said.

Dr. Zinsmeister was part of a four-man team sponsored by the National Science Foundation. He said the team's visit was the first by American scientists to the Seymour Island area since 1902.

Soviet Announces It Plans to Reduce Antarctic Whaling

LONDON, June 23 (Reuters) — The Soviet Union announced today that it would phase out one of its three Antarctic whaling fleets as a gesture to growing conservationist pressure.

The statement came at the start of the 27th annual meeting here of the International Whaling Commission, where continuance of the struggle over survival of the world's largest creature is expected. The meeting will last a week.

The Soviet delegate, I. V. Nikonorov, gave cautious ap-

proval to a plan proposed by Australia for reducing the levels of catches and safeguarding endangered species.

After announcing the reduction of the Soviet whaling effort, Dr. Nikonorov said he believed the Australian plan would work provided the whaling commission showed "wisdom and understanding" about catch levels.

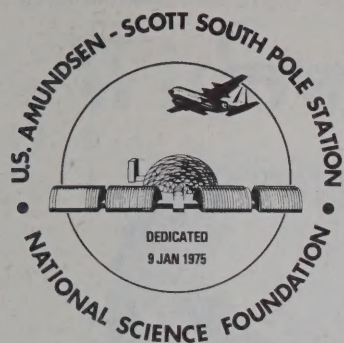
The Japanese delegate Iwao Fujita, said that acceptance of the Australian plan was not easy for the Japanese whaling industry. Japan and the Soviet Union together account for about 80 per cent of the world's whale hunting.

But Mr. Fujita said he thought some agreement could be reached, provided that limits were not set in excess of conservation needs.

The Australian proposal calls for three categories of protection. In the first group are totally protected species, like the giant blue whale. Second,

the plan calls for an automatic cutoff in hunting of species that fall below the level regarded as critical. The third provision is for carefully regulated hunting of stocks deemed to be in no danger of serious depletion.

The commission members are Argentina, Australia, Brazil, Canada, Denmark, France, Iceland, Japan, Mexico, Norway, Panama, South Africa, the Soviet Union, Britain and the United States.



Imprint appearing on stationery of Amundsen-Scott South Pole Station

New Station Dedicated At South Pole

Holmes & Narver

The new Amundsen-Scott South Pole Station was dedicated January 9th with participation by an imposing group of scientific and Government dignitaries. Among the visitors on hand for the occasion was H&N President Jim Johnson.

The new station, which was erected by Navy Seabees, was augmented and completed by H&N construction crews during the last two austral summer seasons. It is in use now and only a small construction team remains to make any last minute operational adjustments.

Dedication ceremonies took place on a beautiful summer day with clear skies and a balmy eight-below-zero temperature. Speakers included Dr. H. Guyford Stever, Director of the National Science Foundation; Dr. Robert Hughes, Assistant NSF Director; Lt. Commander Merlen Howe, Navy Chaplain; Dr. Norman Hackerman, the Chairman of the National Science Board; the Honorable J. J. Pickle, Congressman from Texas; and Dr. Tore Gjelsvik, who is President of the Scientific Committee on Antarctic Research.

Mementos were presented to Station Manager Richard Wolak for permanent display at the station. These included a plaque from the Commander in Chief of the Pacific Fleet, presented by the Commander, Naval Support Force Antarctic; a framed picture of polar explorer Roald Amundsen's tent at the pole and a replica of his boots, presented by Dr. Gjelsvik; and a framed original of a letter from President Ford to Dr. Stever, presented by Dr. Stever.



Pole visitors Dr. Martin Finley, RAdm. James B. Stockdale, Ambassador Armistead Selden, Dr. Stever, Dr. Thomas Jones, and H&N's Jim Johnson

Russians Also Study Permafrost Paradox

By FRANK CREPEAU
Associated Press Writer

YAKUTSK, U.S.S.R. (AP) — Russians call permafrost the "Northern Sphinx" because it presents man with a paradox:

Frozen earth that is rock-hard and impervious, is also a precariously balanced ecological system that can be thrown into chaos by careless treatment.

An area hard as granite in winter can become a summer swamp, and heavy machinery that breaks the skin of vegetation over permafrost can lead to vast scars heaved up on the landscape.

"If the permafrost melted tomorrow it would be a desert here," says Rostyslav Kamensky, an assistant director of the Soviet Union's Permafrost Institute. "Our wonderful forests would disappear and we would have nothing."

Permafrost, frozen earth that can be nearly a mile deep, covers approximately 50 per cent of the Soviet Union, and in that area there are natural resources of tremendous value.

Two-thirds of Canada is in the permafrost zone, as is all but the very southern strip of Alaska. There is even permafrost on Mt. Fuji in Japan and Mt. Kilimanjaro in Africa, but at least nobody is trying to build railroads, mine coal or put up large buildings on those mountains.

Early builders ignored permafrost at their peril. One can see log buildings in Yakutsk and elsewhere across Siberia with the windows at ground level because the heat of the buildings melted the permafrost and they slowly sank.

Built in such a way, tall concrete buildings would topple, dams would crack and bridges fall.

There were plenty of examples of such destruction on the Trans-Siberian Railway line built in the early years of

the century.

Now, the basic rule is "leave permafrost in peace," and everything is done to preserve it in its frozen state. Buildings, for example, are put on piles to leave an air space so that heat does not reach the ground.

Kamensky took visitors into the institute's underground laboratory. In one tunnel 36-feet below the earth's surface, the frozen sandy walls were so firm no supports were needed — an illustration of how the rigidity of permafrost can be an advantage.

"Once you study permafrost you realize it is our friend, not our enemy," Kamensky said.

Two such underground vaults are used for storage of meat and fish in Yakutsk, he said. Since their temperature is only about 25 degrees, the supplies can be kept colder by piping in frigid air from outside.

Though methods of erecting buildings or laying railroads on permafrost are well developed, there is still a problem in transporting oil by pipeline through permafrost areas.

The oil must be warm to move and that poses a danger of thawing the permafrost. When that happens, the surrounding permafrost can settle and crush the pipes.

"I can't say this problem is solved either here or in the United States," Kamensky said.

Also unsolved and under study is what to do when man wants to build a city on permafrost. He may destroy the snow cover, fell trees, drain swamps and thus produce a greater penetration of heat into the ground.

Then the ground can sag, craters or lakes may be created or the ground could heave upward. Especially fragile are areas honeycombed by latticeworks of ice 10 feet high and covered only by two to six feet of earth.

New head of polar programs

On April 14, 1975, Robert H. Rutford, a geologist with several years of antarctic and arctic experience, became head of the National Science Foundation's Office of Polar Programs (OPP).

The post had been vacant since May 28, 1974, when the former head, Joseph O. Fletcher, became head of the Foundation's Office for Climate Dynamics. Alfred N. Fowler, deputy head of OPP, and Kendall N. Moulton, OPP's associate manager for polar operations, had alternated as acting head during the interim. Mr. Fletcher since has become deputy director of the National Oceanic and Atmospheric Administration's Environmental Research Laboratories in Boulder, Colorado.

Before joining the National Science Foundation staff, Dr. Rutford was director of the Ross Ice Shelf Project and an associate professor of geology at the University of Nebraska, Lincoln. He received the B.A., M.A., and Ph.D. degrees from the University of Minnesota, where he also served as a research assistant and a research fellow. He was the leader of a University of Minnesota antarctic research team in 1963, after having participated in two previous antarctic expeditions.

Dr. Rutford became an assistant professor of geology at the University of South Dakota in 1967, and an associate professor in 1970. He was chairman of the Department of Geology, and later the Department of Geology and Physics, from 1969 until he left to join the University of Nebraska in 1972.

Reprinted from *Antarctic Journal*

Brocklehurst Antarctic Explorer, Diplomat

From News Dispatches

MACCLESFIELD, England, Jan. 31—Sir Philip Brocklehurst, last survivor of Sir Ernest Shackleton's Antarctic expedition of 1907, died Tuesday at age 87.

He was one of a dozen pioneer scientists who sailed with Shackleton from New Zealand in a wooden sailing ship, the *Nimrod*. The explorers got within 97 miles of the magnetic South Pole.

Sir Philip, who carried out geological surveys on the expedition, was awarded the Royal Geographical Society's Polar Medal on his return in 1909.

Sir Philip had a distinguished army career in the two World Wars, and was British consul to Palestine and Transjordan for two years from 1943.

The baronetcy is now extinct as Sir Philip was the last surviving member of the Brocklehurst family on the male side.

A housewarming for the new South Pole Station

Political leaders, administrators, scientists, and logisticians from the United States and other countries dedicated the new U.S. Amundsen-Scott South Pole Station in ceremonies at the site on January 9, 1975.

International aspects of the new station permeated the hour-long ceremony, which was presided over by Robert E. Hughes, assistant director for national and international programs, National Science Foundation. Dr. Hughes first introduced Norman Hackerman, chairman of the National Science Board, who noted: "It seems particularly appropriate that a station at the southern axis of the world, where the meridians radiate northward and touch all lands, should be international in character and in scope."

U.S. Congressman J. J. Pickle noted that, "What we learn here can be as important—really—or even more important than what we can learn in outer space." Mr. Pickle remarked that the United States is "not unmindful of the many possibilities for development" in Antarctica. But, he said, "This is the one place in the whole world where environment comes first. . . . The station we dedicate today is another announcement to the world that we propose to move onward in the area of polar science."

Tore Gjelsvik, director of the Norwegian Polar Institute and president of the Scientific Committee on Antarctic Research, International Council of Scientific Unions, called the station "a flagship, you may say, for the U.S. antarctic research program" and even "a flagship for SCAR itself. . . . It is fitting that the United States maintains this station," he said, "because the United States has in many ways been a leading candidate in the Antarctic ever since Admiral Byrd started his expeditions in the late 1920s."

Dr. Gjelsvik presented to the station a photograph of Roald Amundsen, his party, and their tent ("Polheim") at the South Pole in 1911. The photograph is inscribed "the first South Pole Station."

Richard Wolak, station manager and employee of Holmes and Narver, Inc., acknowledged the work of the many groups that contributed to design, construction, and operation of the new station.

H. Guyford Stever, director of the National Sci-



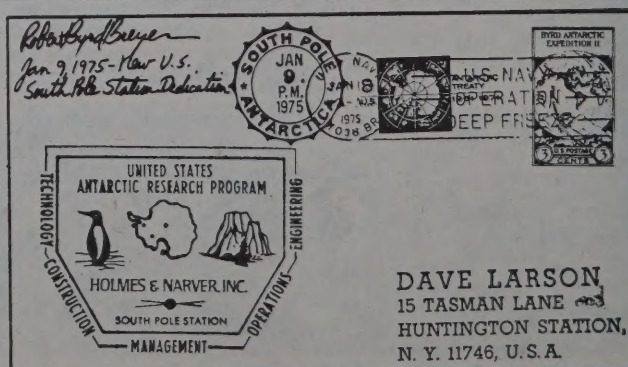
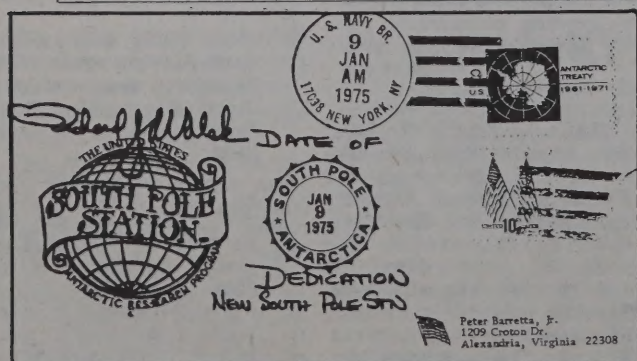
Walter R. Seelig

Richard Wolak (right), 1974-1975 station manager, accepts mementos for the new station from Tore Gjelsvik (left), director of the Norwegian Polar Institute and president of the Scientific Committee on Antarctic Research. The gifts, presented during the January 9, 1975, station dedication ceremony, included a photograph of Norwegian explorer Roald Amundsen and his party at the Pole in 1911 and replicas of the boots worn by Amundsen when he became the first to reach the Pole.

ANTARCTIC JOURNAL

ence Foundation, called attention to the great logistics effort required to support the station: "One couldn't go two steps across this station today without realizing that every piece of scientific data, every paper that's written, has a partnership of authors not listed which is very large. . . . It's been the spirit of Antarctica since the very beginning."

Dr. Stever read a letter from the President of the United States. It said, in part, "I am pleased to see that nationalistic objectives of early expeditions to Antarctica have faded before the spirit of international cooperation embodied in the Antarctic Treaty. . . . The dedication of the new Amundsen-Scott South Pole Station is also a rededication by the United States to the ideals of the Antarctic Treaty. . . . By making our South Pole facility accessible to scientists of all nations, we reaffirm our devotion to the ideals of cooperation that are characteristic of Antarctica and that have extensively benefitted mankind. Sincerely, Gerald R. Ford."



Widow at Pole ceremony

Jan. 8

A dedication ceremony will be held at the new Amundsen-Scott South Pole Station in the Antarctic tomorrow—weather permitting.

Among the official party will be a woman, Mrs Ruth Siple, for whom the ceremony has a very personal significance.

Mrs Siple is the widow of Dr Paul Siple, scientific leader of the team which in 1957 built the former station at the South Pole. The 18 Americans in that party were the first to live at the pole.

The 1957 expedition was the culmination of Dr Siple's expeditions to the Antarctic. One of the best known Antarctic scientists and explorers, he went on five expeditions to the continent that had fascinated him from his first visit as a Boy Scout with Rear-Admiral Richard E. Byrd's expedition in 1928-1930.

It was after that expedition, during their college days, that Paul and Ruth Siple met. She was an English major, but very soon changed, she recalled in Christchurch yesterday, to his scientific discipline of biology. The couple were married in 1936 in the college chapel, after his return from his second Antarctic expedition.

WIFE PREPARED

So Ruth Siple was prepared for her husband's abiding interest in the Antarctic. She makes light of the necessary separations, the time spent bringing up their three daughters alone, and the awareness that her husband was working in an environment that, even today, can be hostile.

There were times, Mrs Siple said, when she wished he had had interests nearer home. But this was his field, and one in which he excelled.

"I'm sure many men have not been able to do things like that because their wives have said, 'I don't want you to go,'" she said.

Mrs Siple simply resolved not to worry. She told herself that anyone could have a fatal accident right at home.

During the long separations, there were occasional conversations by ham radio,

Their first daughter, Ann, was born in 1940, while Dr Siple was in the Antarctic. With the help of a radio enthusiast in Pennsylvania, where she was living, Mrs Siple was able to talk to her husband from the hospital (Ann Siple, a graduate in anthropology, "inherited her father's brains," and was an A student, like her sisters—all of whom share also Dr Siple's artistic bent).

Always there were long letters to write. Dr Siple arrived at the South Pole in December, 1956, when the building of the station was in its early stages. The team got its first mail in October 17, 1957. In his book, "90deg South," Dr Siple mentions that there were 12 letters from his wife.

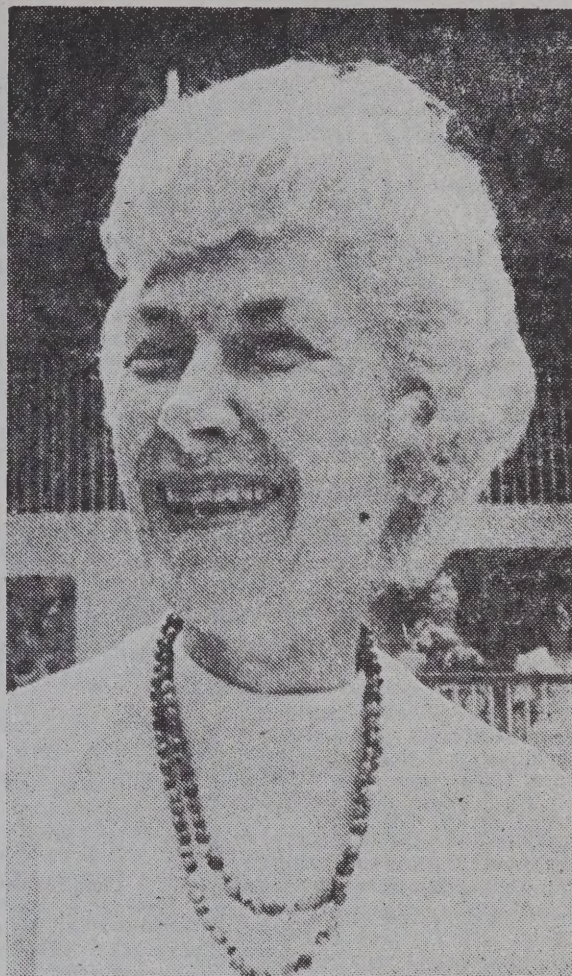
"I just kept on writing letters, though I never quite knew when he would receive them," she said.

His homecomings were always happy events. It was, Mrs Siple remembers vividly, a bitterly cold day when he returned home from the South Pole expedition late in 1957. The weather will be a good deal colder for the ceremony tomorrow, but Mrs Siple is ready for anything. She has her Antarctic "kit," and her only worry is how she will be able to get round in the special heavy-duty boots.

Antarctic clothing these days is much the same, as her husband wore, she said, but with much more colour. The bright red jacket, however, has not been introduced for fashion but to make the wearer conspicuous on the ice.

A year after Dr Siple's death in 1968, Mrs Siple took a course for women, "Developing New Horizons," at the George Washington University, in Washington. For the last five years, she has worked as a library research assistant for the National Geographic Foundation.

This is her first visit to the



MRS SIPLE

South Island, although she visited New Zealand while her husband was with the United States Embassy in Canberra as scientific attache to Australia and New Zealand from 1963 to 1966.

GIFT FOR MUSEUM

With her she has brought a silvered glass ball for the Canterbury Museum's Antarctic Centre that has been very much part of her home for the last 17 years. It rested on top of a symbolic "South Pole" near the geographic Pole during the building of the South Pole station and, her husband "souvenired" it. Mrs Siple presented it yesterday, in remembrance of Dr Siple, to Mr B. N. Norris, honorary curator of Antarctic relics at the museum.

While she is in the Antarctic, Mrs Siple hopes to visit Siple Station, named after her husband. Her name was once also on the map of Antarctica. But she is happy Mount Ruth Siple has been renamed Mount Siple. "It is right that it should be named for my husband, not me," she said.

Dr Siple, who took part in the construction of the station, decided on December 14 to erect a "South Pole" in an effort to give morale a boost.

The "South Pole" was a bamboo pole, which had been painted with orange and black stripes in barber pole fashion.

In his book "90deg South," which describes the building of the Pole station, Dr Siple said: "To the top of the pole we affixed one of the 16-inch mirrored glass balls I had purchased in New Zealand."

"The ball was literally a gift from the heavens, for when it was dropped from a Globemaster I had watched it come shooting down to within a few feet of the ground, when the parachute miraculously opened. Besides being an ornament we hoped that the sunlight flashing on the mirrored ball would help make the campsite more easily visible from the air."

"We put our 'symbolic South Pole' on top of the garage, even though we knew this was not the true geographic Pole."

Antarctica Considered Ideal Medical Laboratory

McMURDO STATION, Antarctica — There are some things going on down here that they can't explain in medical schools.

If you break a bone it will take much longer to mend here, than it would in the outside world. If you cut yourself it will take longer to heal here. Why? No one knows.

If you catch a cold—and surprisingly, you are not likely to do that—Your friends probably will not catch it from you because communicable diseases are somehow less communicable in the antarctic.

Wounds rarely become infected. No one knows the reason for that either.

Medicine has much to learn about very cold, very dry climates, and about what physical isolation does to the human body.

Doctors almost never see frostbite in the Antarctic and only rarely see cases of exposure (hypothermia). Both are caused largely by carelessness—an infrequent but fatal affliction in this region.

The population is ideal for medical research. It is un-

usually healthy. Everyone permitted to come here has undergone extensive physical examinations, even short-term visitors.

In the Antarctic, where the population is small and isolated, the number of diseases floating around is much lower than the number in the outside world. As a result, the people here are immune to fewer diseases than they would be at home.

"Back home everyone exchanges everyone else's viruses to keep one's immune system active," said Dr. Michael Hummer of the University of Oklahoma, the physician at the South Pole station.

"After about six weeks, one's body is more or less set to handle [only the] viruses down here."

If an outside virus gets in, people who would normally be immune to the ailment get sick. Dr. Michael Lundberg, who wintered-over at the remote Siple station with three other men, said that even a shipment of wool clothing into an isolated base might cause sickness, probably because of viruses and bacteria in the wool.

Salvage camp on ice for damaged planes

May 19

A salvage camp will be built 683 miles from McMurdo Station next summer, where two United States Navy ski-equipped Hercules aircraft, which crashed last summer, will be repaired and flown to Christchurch or to the United States.

This was decided at a planning conference in the United States earlier this month devoted to ways of salvaging the two \$15m planes.

The salvage camp and ski-way at Dome C, 683 miles from McMurdo Station, will be built by the National Science Foundation's public works office, and the Lockheed Company. It is intended to make the aircraft capable of being flown to Christchurch, or the United States, for a complete overhaul.

The planning conference was the first of several meetings which will resolve problems associated with the salvage operation.

The two aircraft crashed on January 15. One aircraft had gone from McMurdo Station to pick up a joint American-French scientific party but during take-off a

jet-assisted take-off bottle exploded. A fire started, the aircraft skidded round and stopped, and the fire destroyed the wing. Nobody was injured. When a second Hercules arrived to pick up those stranded, its nose ski collapsed, puncturing the fuselage.

At one stage late last season, a plan was being considered to tow the aircraft back to McMurdo Station for repairs. It was then thought that surveys would have to be made to see if there was a practical route over which bulldozers could tow the big planes. Such a tow could last two seasons.

An American party visited the site of the crash late in January to assess the situation. The conclusion reached then was that the two Hercules could be repaired, but not where they now are.

CGC Polar Star Precommissioning Detail established

The CGC *Polar Star* Precommissioning Detail was established on October 2, 1974, at the Naval Support Activity in Seattle, Washington. Captain Norman C. Venzke is the commanding officer, and he has a group of 14 officers and enlisted men planning for the commissioning of the icebreaker.

The CGC *Polar Star* is 121.62 meters long, has a beam of 25.60 m, a full load draft of 9.14 m and displacement of 10,886.40 metric tons. The icebreaker will be propelled by three 4.88-m diameter controllable pitch propellers. The propellers will be driven by a combined diesel or gas turbine plant. During cruising and light icebreaking, an 18,000 horsepower diesel electric plant will be used. The icebreaker will also be equipped with modern communications and navigational equipment, including satellite navigation devices.

The CGC *Polar Star* will perform training and operations from October 1975 through January 1976, culminating in shakedown training at Fleet Training Group, San Diego, California. The icebreaker will then go to the Arctic for icebreaking tests in February and March 1976. The first operational mission is scheduled for the western Arctic during summer 1976.

Vanda Station closed for the winter

Jan. 29

Summer research is over at Vanda Station, about 80 miles west of Scott Base, in the Wright Valley. The small inland base was closed at the week-end for the winter.

Unless there were sufficient scientific reasons for reopening it during the winter, Vanda Station was likely to be used in future for summer research only, said the superintendent of the Antarctic division of the D.S.I.R. (Mr R. B. Thomson) in Christchurch yesterday.

For its first two years, the station opened in 1968, was run on a year-round basis but was manned again last winter.

Mr Thomson said that if the scientific community felt there was a need for further winter research at Vanda Station, then such requests would be given every consideration.

"It will remain a summer station for a number of years yet, although not indefinitely," he said. "The base has fulfilled not only New Zealand's scientific purposes but those of the United States, the Soviet Union, and Japan."

Very little work had been done in the Victoria Valley not far away, and the Antarctic division might consider moving the small station there once there was little left to do in the Wright Valley.

Normally, the small base accommodates between six and eight persons, but this summer about 300 have used it. On its busiest day, it accommodated 22 persons.

Coast to Coast?

CONTINENTS IN MOTION:
THE NEW EARTH DEBATE
by WALTER SULLIVAN
397 pages. Illustrated.
McGraw-Hill. \$17.95.

During World War I, while a young German officer lay in a hospital recuperating from his wounds, he passed the time looking at maps and pondering the remarkable way in which the opposing sides of the Atlantic seemed to fit together. Alfred Wegener was not the first to notice that the bulging coastline of Brazil is a reciprocal of the west coast of Africa. For centuries scientists and cartographers speculated that a single large continent, which came to be called Pangea, had broken up into huge fragments that floated like rafts on the earth's plastic core until they reached their present positions. Such theories, however, were consistently hooted down with the derision scientists so often reserve for new ideas. Wegener, who had already established a reputation as a polar explorer and meteorologist, was undaunted. After his recovery, he devoted his life to proving the theory of continental drift. In 1930 Wegener died in Greenland in a search for evidence. But other men were able to carry on where he left off. Today, with slight variations, the idea that the earth is a fragile and constantly changing planet is generally accepted by most geologists.

Books dealing with the formation of the earth usually move only slightly faster than the glaciers that helped landscape the surface of the planet (about 20 miles a millennium). *Continents in Motion* is a striking exception. Walter Sullivan, science editor of the New York Times, concentrates as much on people



BEFORE DRIFT—225 MILLION YEARS AGO



AFTER DRIFT—160 MILLION YEARS LATER
A debt to Velikovsky.

and events as upon geological epochs. The result is a book nearly as entertaining as a good detective story—and considerably more informative.

Sullivan builds his case for continental drift carefully, treating skeptics as fairly as he does supporters of this once controversial concept. He is clearly no believer in Immanuel Velikovsky, whose theory that cataclysmic planetary events reshaped the earth during biblical times was first scorned and then suppressed by the scientific establishment. Sullivan acknowledges modern geologists' debt to Velikovsky for forcing them to re-ex-

amine old assumptions about the earth's formation. He deals much more favorably with the late Maurice Ewing, who founded Columbia University's Lamont Geological Observatory and provided the theoretical basis for things like submarine geology and attempts to study the underwater mountain range that bisects the Atlantic. Nor does he slight the host of others who have mapped the ocean bottoms, peered into smoking volcanoes or attempted to drill through the earth's crust to the semimolten mantle that surrounds its liquid core. Along the way, Sullivan scatters suggestive pieces of evidence with a skill that would do credit to Agatha Christie. He points out that the ancestors of certain North American animals seem to have come to their new home from Asia, something they could not have done if an ocean barred their way. He reports that the sea floor is spreading constantly on both sides of undersea ridges, notes that the Himalayas are growing at the rate of a few inches a century, forced upward as the Indian subcontinent pushes itself against the Asian mainland.

Sullivan's narrative does not make for casual reading. Despite its easygoing approach, *Continents in Motion* is a serious book. It is a disturbing one as well, for it ends on as deep a note of mystery as it begins. The theories of continental drift explain how the continents and the oceans that separate them were formed. But those theories can only hint at probable changes to come. The earth does not exist in a steady state; the forces that gave the planet its present topography are still at work. How they will reshape the earth or rearrange the continents is uncertain. What is certain is that, given time, they will. ■ Peter Stoler

TIME, JANUARY 13, 1975

Two continents once joined?

Jan. 13

The riddle of where Australia and the Antarctic were joined millions of years ago was closer to solution yesterday when New Zealand scientists returned to Christchurch from Scott Base with data collected during a 60-day geological expedition in the Bowers Mountains area of Northern Victoria Land.

The scientists' discoveries indicate that the area, 500 miles north of Scott Base, is closely linked geologically with Tasmania and the evidence is the most convincing yet to show the Bowers Mountains were once linked to southern Australia.

For some years scientists have accepted that the two continents were once joined but there have been many differences on the precise points.

Dr M. G. Laird, of the New Zealand Geological Survey in Christchurch and leader of

one of the two parties involved in the expedition, said previous rock comparisons indicated that the Bowers Mountains might have been linked with Tasmania, South Australia, New South Wales or even Victoria.

"As it turned out the rocks of the Bowers Mountains have many similarities with those of Tasmania and are quite dissimilar to those elsewhere in Australia."

Dr Laird's discoveries have been supported by fossil in-

formation collected in the same region by the second party led by Dr R. A. Cooper of the Geological Survey in Lower Hutt.

His party's work was considerably assisted by Dr J. B. Jago, a lecturer in geology at the South Australian Institute of Technology, Adelaide, and an expert on Tasmania's rocks and fossils from the Cambrian Age (500m to 600m years ago).

"He knew the Tasmanian sequence well enough to tell us immediately if the fossil sequence in the Bowers Mountains were similar," said Dr Cooper.

Dr Jago will return to Australia next week but his involvement with the expedition's work will continue. In Adelaide he will begin to study the large collection of fossils brought from the

Antarctic by the party.

Dr Cooper said the party had collected enough fossils to keep three men busy for three years and that he and Dr Jago would share the task to save time.

The two field parties worked independently in the Bowers Mountains and met only once to compare notes and to meet a supply flight. Collectively they travelled more than 1000 miles and their work involved numerous climbs to rocky outcrops free of ice and snow to collect material.

Walrus Born in Captivity

PALOS VERDES, Calif., May 21 (UPI)—A 75-pound female baby walrus, reportedly the first born in captivity, was born at Marineland, an aquatic animal entertainment complex. The mother, Petulia, is a comparatively petite—for walruses—3,000 pounds. The father, Farouk, weighs 4,500 pounds.

NOW IN THE NORTH

AIDJEX Main Camp Now A

By Leslie Nakashima
and Dorothy Underwood
Naval Arctic Research Laboratory

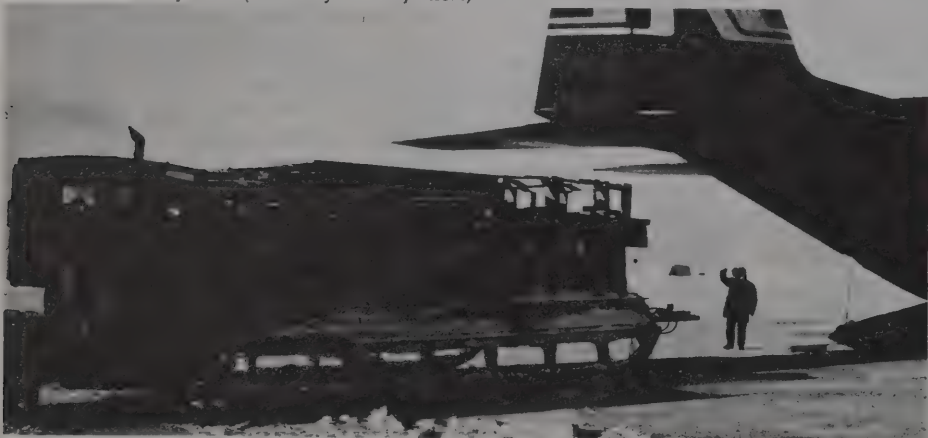
Barrow



AIDJEX MAIN CAMP on Beaufort Sea ice. (Photo by Leslie Nakashima)



AIDJEX MAIN CAMP at time of first C130 landing on March 16. At right is radio tent and at left messhall-dormitory tent. (Photo by Rolf Bjornert)



PREFABRICATED BUILDINGS and fuel drums destined for AIDJEX camp are loaded on C130 Hercules. (Photo by Leslie Nakashima)

The largest scientific arctic project ever supported by the United States is now under way on the pack ice 450 miles north of the Naval Arctic Research Laboratory (NARL) here. (NARL is operated for the Navy by the University of Alaska).

On March 12, scientists of the Arctic Ice Dynamics Joint Experiment (AIDJEX) located an ice floe in the Beaufort Sea suitable for their research and immediately established a tent camp.

Working out of NARL, an Alaska International Air C130 Hercules began transporting supplies, equipment, and personnel to the main camp site on March 16. Flights were made around-the-clock, with NARL loading crews and AIA personnel rotating on 12-hour shifts. As many as five round trip flights were made in a single 24-hour period, with an average round trip time of six hours. While temperatures on the ice averaged -20 degrees F, NARL loading crews faced wind chill factors as low as -76 degrees. Loads averaged 40,000 pounds, with the fastest loading time being 27 minutes from the time the door of the C130 was opened to the time it was closed. By March 24, the camp was ready for occupation by scientists.

"Big Bear," as the AIDJEX main camp is called, is now a thriving community of over 50 scientists, technicians, and support personnel. It consists of 36 wooden buildings, several Parcoll tents, and a mess hall. The buildings are painted a bright fluorescent orange for maximum visibility against the ice, and can be seen from a distance of about five miles. Electricity is available from a main generator, and heat for the buildings and tents is provided by diesel oil stoves. Fresh water is obtained by melting aged ice. A Twin Otter aircraft is based at Big Bear to deploy data buoys, along with a U.S. Geological Survey helicopter which will participate in remote sensing experiments. Rolf Bjornert is the AIDJEX camp manager.

The primary objective of the AIDJEX program is to develop a predictive model of sea ice movement in the Arctic. In order to accomplish this, many different factors will be examined, including wind and air stress, ocean tilt, seismology, stress and

Thriving Community Of More Than 50

strain in ice, and ice thickness distribution.

In addition to the main camp, three satellite camps have been established in a 100-kilometer (60-mile) radius around the main camp. Dubbed Snowbird, Blue Fox, and Caribou, each will eventually consist of three prefabricated buildings, a Parcoll tent for sleeping quarters, and a generator hut. The research conducted there will attempt to determine stress-strain relationships in ice. Working with the Navy Navigation Satellite System (NAVSAT), each camp will transmit positioning data to the main camp, and collect meteorological and oceanographic data.

Ten data buoys will be deployed in a 300-kilometer (180-mile) radius around Big Bear. Called the Arctic Environmental Buoy (AEB), these instruments will be used to verify predictions of the ice movement model. They are designed to record complex telemetry, barometric, and temperature sensing data, and to accurately determine their positions by working with the NAVSAT system. Once installed, they will begin recording data in their memory banks simultaneously each day. The data will then be transmitted to a data acquisition system at the main camp. Personnel involved in the data buoy system include Wally Brown, project manager; Pat Martin, technical coordinator for AIDJEX; Alan Thorndike, AIDJEX scientist; Robin Gauss and Lane Tufts, installation engineers; James Rigdon, computer programmer; and Marcia Williams, technician.

Responsibility for determining different parameters in the AIDJEX project is divided between American and Canadian scientists. The Canadians will participate in remote sensing of the ice to determine ice thickness distribution in the ocean. They will also collect data on air stress, ocean tilt, and oceanography.

During a second C130 airlift effort completed in April, 12 loads of fuel were transported to Big Bear in 52 hours. To date, nearly two million pounds of supplies have been delivered there in a total of 44 flights. NARL loading crews under the direction of Bill Lasher and Kenny Toovak expedited the airlifts.

In cooperation with Dr. Norbert Untersteiner, project director for AIDJEX, the Naval Arctic Research Laboratory will support the AIDJEX project until its projected termination in April of 1976. NARL aircraft will make resupply flights on a weekly basis and transport personnel to and from the camp.



AIDJEX LOGISTICS COORDINATOR ANDREAS HEIBERG, second from right, and NARL personnel load fuel bladder on C130 Hercules. (Photo by Leslie Nakashima)



FLAG GOES UP at main AIDJEX camp after its establishment in March. At left is Dr. Norbert Untersteiner of the University of Washington, chief scientist for AIDJEX. Others in photo, from left, Allan Gill of Columbia University's Lamont-Doherty Geological Observatory, station manager Mogans Mathiasen, and camp cook Matt Valley. (Photo by Rolf Bjornert)

NOW IN THE NORTH

People

Frost-bitten feet forced the University of Alaska, Anchorage's entry in the recent 1,049-mile Iditarod Trail Sled Dog Race, retired Air Force Col. Norman D. Vaughan, to quit the grueling event at Farewell and put him in the hospital for 10 days. The veteran musher, at 69, the oldest in the race, had hoped to continue after receiving emergency treatment, but a doctor told him he could lose his toes if he continued. Faculty, staff and students raised nearly \$3,000 to finance Vaughan's attempted run to Nome. At Skwentna his sled was badly damaged in an accident but he was able to obtain another from a racer who had scratched. Vaughan, who is employed in the Physical Plant at Anchorage, was a dog musher with Adm. Richard E. Byrd's first antarctic expedition in 1928-30 and later drove a team for the Grenfell Medical Mission on the Labrador coast, and on an unprecedented rescue mission in Greenland during World War II. He raced for the United States in the 1932 Olympics, the first and only time a mushing event was scheduled, and was the first Outside musher to take part in Fairbanks' North American Championship Race.



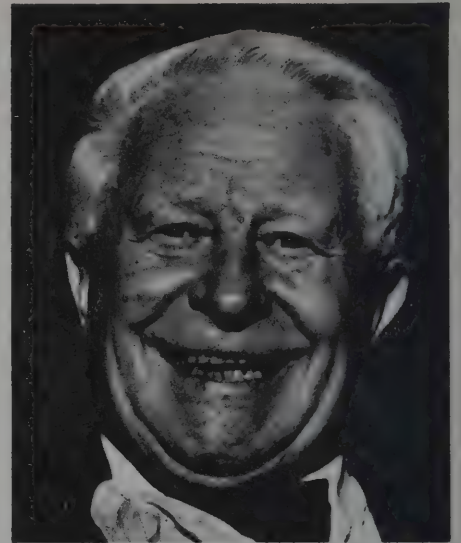
Vaughan and team

The Arctic Institute of North America has presented its Fellows Award for 1974 to Dr. Laurence Irving, professor of zoophysiology and advisory scientific director at the university's Institute of Arctic Biology. The scientist received a 10-inch-high figure of an arctic owl carved in stone by an Eskimo carver and a citation recognizing his "long and distinguished research in physiology of arctic life during which he established and was first director of the Arctic Research Laboratory at Barrow and first director of the Institute of Arctic Biology at the University of Alaska." Irving, who will be 80 in May, was director of the institute from 1962-66, and the building on the Fairbanks campus in which it is located is named for him. From 1949-62 Irving was chief of the physiology section at the Arctic Health Research Center, located in Anchorage in those years.



Irving

An 11,140-foot peak in the Alaska Range has been named for the late Col. Bernt Balchen, famed aviator-explorer who piloted the first flight over the South Pole and blazed the polar air route from Alaska to Europe after World War II. The university conferred an honorary Doctor of Science degree on him in 1954. The peak named for Balchen by the U.S. Board on Geographic Names is 4.4 miles west of Mount Hayes and near Mounts Skarland and Geist, named for the late University of Alaska anthropologists Ivar Skarland and Otto Geist, close friends of Balchen. Dr. Terris Moore, former president of the university, Jimmy B. Bedford, head of the university's Journalism Department at Fairbanks, and Charles J. Keim, professor of jour-



Balchen

(Photo by Jimmy Bedford)

nalism and English at Fairbanks — fellow members of the Explorers Club of New York with Balchen — recommended that the peak be named for him.

Now in the North, a faculty-staff publication, is published bimonthly September through May by the University of Alaska's Office of University Relations and Development, located on the Fairbanks campus. Gerald E. Bowkett, Editor.



GEOPHYSICAL INSTITUTE scientists Glenn Shaw, right, and Takeshi Ohtake shake hands across precise location of the geographic South Pole, Ohtake in the eastern hemisphere and Shaw in the western. The altitude where they are standing is 9,186 feet and the ice thickness more than 9,000 feet. Shaw and Ohtake were at the new U.S. South Pole Base to study, respectively, dust particles in the air generated by industry and carried by the winds to central Antarctica, and ice crystal formation. In the interest of accuracy, quipped Shaw, the photo probably ought to be run upside down.

Oil Pipeline Work Starts; 10,000 on Job in Alaska

**After 6 Years of Problems, Crews Begin
Hacking Out 789-Mile Route to Sea—
First Fuel Flow Due in 30 Months**

By ANDREW H. MALCOLM

The New York Times

SHEEP CREEK CAMP, Alaska, March 9—The Alaskan oil pipeline has been begun.

After six years of litigation, Congressional controversy, research, planning, purchasing and, finally, hiring, more than 10,000 men and women have begun hacking out the route for the 43-inch-wide pipeline, which will cost more than \$6-billion. It is the largest private construction project in this country's history.

If all goes according to schedule, an unlikely prospect given the scope of the undertaking and the engineering feats involved, 30 months from now the first barrels of crude oil from the rich Prudhoe Bay field will, after millions of years underground, begin flowing at four miles an hour from the frozen Arctic tundra of Alaska 789 miles to the ice-free southern port of Valdez.

From there fleets of tankers, now being built, will carry the lucrative liquid to United States refineries.

Construction crews have already laid a 200-foot section of pipe near Fairbanks and oil flows there now to test valves and other pipeline gear in rugged winter weather.

Crews are also preparing to lay pipe under the frozen Tonsina River in the next few weeks, while other laborers work 12-hour days and seven-day weeks to weld pipe and to build roads, pump stations, construction camps, tanker terminals and other facilities.

The task is a formidable one, involving as it will at peak periods, some 16,000 workers scattered over the nation's largest state, an immense area that spans four time zones and could cover almost 12 New York States.

The workers will be laying some 101,850 sections of steel pipe (made in Japan) above ground and below ground,

across fields, swamps and rivers and over ice-slick mountain passes where the five-ton pipe sections must rise almost vertically. Tons of dynamite will be needed to blast a bed for the pipes in a two-mile section of Keystone Canyon near here.

Oil-related income and development will finance most of the future of Alaska, which has already seen some of its rural innocence lost in the feverish boom town rush that grips much of this state.

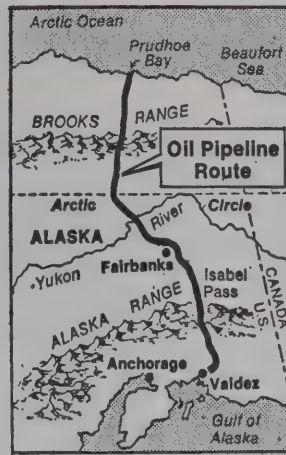
Twenty miles south of here in Valdez (pronounced Val-DEEZ), which has twice as many liquor stores as grocery markets, the population has more than tripled to more than 3,000 in 24 months. And Alaska Airlines is inaugurating a "Pipeline Express"—direct flights from Anchorage to Houston and Dallas.

Many essential services are hard-pressed today. Motels are routinely jammed months before the annual tourist invasion from "outside," as Alaskans refer to anywhere beyond the state's borders. In Fairbanks, on the pipeline route, telephone subscribers have waited a minute or more to get a dial tone.

Even nonpipeline industries are affected as trained workers desert their jobs for well-paid pipeline work with its free board and guaranteed overtime. Prices have skyrocketed. Twenty-six persons have died in pipeline-related accidents, mostly plane crashes. And officials are afraid of a flood of unemployed workers from other states seeking jobs, which are not that easy to find and are largely controlled by unions.

Alaska's new governor, Jay Hammond, a former hunting guide, has appointed an 11-member Growth Policy Council to help devise policies for future years. It is headed by Lieut. Gov. Lowell Thomas Jr., son of the radio newscaster, and held its first meeting last week.

And now there is talk of further development with yet another pipeline, this one to carry the North Slope's natu-



The New York Times/March 10, 1975

ral gas supplies to tankers in the south or across Canada to the lower 48 states.

As Mack Inabinett, a transplanted Southerner who has laid pipelines from Biloxi to Bismarck, put it: "Having one pipeline is like being a little bit pregnant. There just ain't no such thing."

"Like here is a brand new deal altogether," said one longtime Alaskan.

Little remains of the initial pipeline controversy. Many residents of Alaska, whose state motto is "North to the Future," attributed the conflict to "do good" environmentalists who live elsewhere. But as a result of their warnings, the state has dictated a complex of regulations for pipeline construction.

"You can't sneeze around here without a permit," said one oil company officer, who minutes later was boasting of more than meeting state requirements in a sewage treatment plant.

At the tanker terminal, for instance, crews must suspend underwater blasting from May through August to avoid disturbing spawning fish. In northern Alaska, much of the pipeline will be buried under historic reindeer routes and the warm pipe will be refrigerated there to preserve the permafrost.

Here at the 40-acre Sheep Creek Camp, one of 20 such facilities along the pipeline route, 210 workers are getting housing ready for 1,000 others expected within 15 months. At this scenic mountain site with a view rivaling that of many famous resorts, bulldozers shove tons of snow aside to make room for 28-man yellow and white housing modules.

In Valdez other workers are preparing the pipes. Roy Robinson, who welds pipe section together from inside, feels he has already crawled 25 miles.

Some 1,400 workers are carving out a mountainside

tank farm and a deep water seaport as the 1,000-acre pipeline terminus.

There, the foundations for 18 giant storage tanks are being raised. Each tank will hold 510,000 42-gallon barrels of oil. Initially, the pipeline will deliver there 600,000 barrels a day and, later 1.2 million barrels. It has been estimated there are 9.6 billion barrels of oil to be piped.

From the tanks that overlook the 600-foot deep, natural blue bay, gravity will carry the crude oil into the holds of four giant tankers simultaneously.

As of today, work on the terminal complex is 3 per cent complete.

Chemist Tests Barrow Snow

Anchorage Daily Times

BARROW — A nuclear chemist has completed his third spring field trip to Barrow to gather snow samples in an attempt to learn man's effect on the physical nature of the atmosphere.

The chemist, Dr. Herbert Weiss of the Naval Undersea Center in San Diego, collected snow at 15-mile intervals from just south of the Barrow gas well to the foothills of the Brooks Range.

In San Diego, he will determine the concentrations of mercury in the samples, and also analyze them for other elements which have found their way into the atmosphere as the result of human activity, and then are carried back to earth by the snow.

Weiss's interest in human effects on the atmosphere started in 1970 when he studied concentrations of sulphur and selenium in the Greenland glaciers. In his glacial samples, he found an increase in sulphur concentrations, particularly during the last decade. And he found sulphur concentrations are lower in ice that is more than 60 years ago. He attributes this to the increase of combustion of fossil fuels by man.

Weiss wants to collect baseline data on the Beaufort Sea environment and the Alaskan Arctic to determine the influence petroleum development will have on the natural environment. He would do this by analyzing water and snow samples.

Polar Bear Matron Adopts Cub

Anchorage Daily Times

BARROW — An orphaned polar bear cub has a new mother, thanks to the efforts of the Naval Arctic Research Laboratory at Barrow and Jack Lentfer, biologist with the U.S. Fish and Wildlife Service.

Last month, officials at the laboratory were asked to take responsibility for the 25-pound cub, which had been retrieved after the mother was shot to provide meat for persons en route to the village of Nuiqsut.

The laboratory officials consulted with Lentfer, then

agreed to keep the bear until it might be returned to its natural environment. The baby bear was made comfortable in the animal research facility, and was fed condensed milk which it lapped from a pan.

Lentfer, who was surveying polar bear populations on the sea ice by plane, kept an eye out for a female bear with cubs who might be a prospective mother. Although scientists were unsure about the acceptance of orphaned cubs by female polar bears, they felt the bear would have a better

chance in nature than in captivity.

Lentfer spotted a female bear with one cub, about seven miles offshore on the sea ice. The bear was immobilized, so Lentfer could collect data and mark her for identification, and a plane returned to Barrow to pick up the cub.

Soon after the cub was placed near the tranquil female she began to nurse, Lentfer reported, and later that day he spotted the female traveling with both cubs.

May 15



The New York Zoological Society

SNOWBALL

April 18

The first polar bear to be born at the Bronx zoo went on public display yesterday for the first time amid delighted "Oo-h-h's!" and "Aa-a-h's!" and the furious clicking of cameras.

The cub, promptly named "Snowball," had apparently been born last November while the 500-pound mother, Olga, spent most of her time in hiding in a special nursery area deep in the back of the regular display pens of the Bear House.

and walrus killed might not sound high and Arctic Bay and Hall Beach are likely the highest-kill areas, but Trudeau said no one knows for certain how many were killed and no one knows for certain how many animals exist.

Trudeau called the 10,000 figure an optimistic estimate. There is no estimate available on the walrus population.

"We know very little about the narwhal, and even less about the walrus," he said.

There are an estimated 10,000 narwhal, which are 10-to 18-foot-long animals, some of which weigh more than a ton and have spearlike ivory tusks or horns.

Assuming there are 10,000 narwhal, no more than 600 to 800 should be slaughtered in one year, the fisheries officer said. An accurate count of kills is difficult to determine because many of the narwhal sink to the ocean floor before the hunters can haul them in.

Musk oxen transplant doing well in Siberia

MOSCOW (AP)—Detente may be sputtering on some levels, but a herd of Alaskan musk oxen is coexisting happily with Russian bears in the northern reaches of Siberia.

"They have acclimatized well," the Soviet news agency Tass said Saturday. "They find fodder for themselves and nothing really threatens them, even the polar bears."

The United States rounded up 40 musk oxen in Alaska last month and shipped them over here as part of an animal exchange program agreed upon in the 1972 accords aimed at normalizing Soviet-American relations. Another 10 shipped by Canada were already here.

The wooly musk oxen, weighing about 700 pounds each, once thrived in north-central

Asia. Centuries ago their ancestors migrated across a then-existing land bridge to Alaska, scientists believe.

Now, Soviet scientists want to re-establish the herds in a big way. They say the musk ox is even more adaptable to the Arctic tundra than reindeer and will fill an "ecological void" in the region. They also are considering widespread domestication of the herds to cultivate the highly prized wool.

Tass quoted Sava Uspensky of the Agriculture Ministry as saying the oxen transfer "was the first major action within the framework of the agreement between the U.S.A and the U.S.S.R. on cooperation in the field of environmental protection."

May 12

Ford Honors 3 Russians' Polar Flight

WASHINGTON, June 23 (AP) President Ford is honoring two Russian airmen and the son of a third today for the first flight over the North Pole from Europe to the United States.

They are Aleksander V. Belyakov, 60, who was copilot, and Georgi F. Baidukov, 78, navigator, on the historic flight in 1937, and Igor V. Chkalov, son of the late Valery Chkalov, the chief pilot.

They made the 5,288-mile flight from Europe to Vancouver, Wash. Their goal was Oakland, Cal., but they headed for Portland, Ore., when they were running short of fuel.

But as the Russian plane, a 110-foot ANT-25, broke through the clouds at Portland, the crew saw a huge crowd waiting. Fearing for the safety of their plane in a large souvenir-hunting crowd, they then headed for Vancouver.

Last Friday, the three Russians attended a ceremony in Vancouver commemorating the 38th anniversary of the flight. Ford asked them to visit him in the White House so that he could personally honor them.

he said.

The numbers of narwhal

Canadian Officer Says Kills Endanger Animals

YELLOWKNIFE, N.W.T. (AP) — The narwhal and walrus could be wiped out of the Canadian Arctic unless Eskimos stop slaughtering the animals for their valuable ivory tusks, warns a federal fisheries officer.

Hugh Trudeau of Yellowknife made that prediction recently after reports that 400 narwhal were killed at the tiny settlement of Arctic Bay, on the northern part of Baffin Island, and that 200 walrus

were shot at another small Eskimo community, Hall Beach, on the Melville Peninsula.

Trudeau, who called the recent kills "very excessive," blamed them on the soaring price of ivory, which is reported to be selling for more than \$25 a pound, and on inadequate government regulations.

"If this (ivory hunting) isn't controlled, I'm sure the populations will be exterminated,"

Polar News From Queens

By MURRAY SCHUMACH

Brooklyn, Queens, Long Island Edition
The New York Times

Feb. 23—

Virtually all communications from either the North or South Poles eventually reach an apartment in Rego Park, Queens, inhabited by August Howard and his wife, Rose, neither of whom has been to either pole or known any temperature colder than New York City in winter.

The seventh-floor home in the high-rise apartment at 98-20 62d Drive has become one of the best known addresses to polar explorers and their families because Mr. Howard, a spry, ebullient, balding man of 65, is founder and secretary of the American Polar Society, and founder, editor and staff of *The Polar Times*, published semiannually by him for 40 years.

Mr. Howard is probably the only person in Queens who is part of the geography of Antarctica. Cape Howard, on the Weddell Sea, 71 degrees, 25 minutes south and 61 degrees, 8 minutes west, was named after him. And the Polar Times Glacier, 69 degrees, 46 minutes south, and 74 degrees, 40 minutes east, was named after the paper he runs — at no profit.

"I never dreamed," he was saying the other day, "that when I used to read the dispatches about expeditions to the poles as a young fellow that some day I would meet Lincoln Ellsworth and Admiral [Richard E.] Byrd.

"Do you know?"—his eyes became bright as a boy's talking about his first *World Series*—"on New Year's Day we got a call from Ruth Siple—she's the widow of the great polar authority Paul Siple, you know—and she said: 'Guess what. I'm flying to the South Pole.'"

Wife Likes Hobby

He got up from his chair in the four-and-a-half-room apartment to scurry into another room, where he burrowed in cartons piled on the floor, looking for some back issue of *The Polar Times*.

His wife smiled as she knitted beneath a picture of a polar bear on an ice floe caring for a cub.

"When I first met him I didn't find out about this polar business for a while. But it's a very nice hobby."

Mr. Howard was back from the cartons with old



The New York Times/Cary Herz

Rose and August Howard looking over copies of *The Polar Times* at their apartment in Rego Park.

copies of his newspapers, and bubbling with expeditions that had succeeded or foundered among the glaciers. Outside the window, the wind howled in appreciation across the parking lot behind Alexander's department store.

"Fortunately," said Mr. Howard, we held up an edition for 30 days. That was because Lincoln Ellsworth was missing on an expedition. I felt certain he would be found! He was. And we put out the paper with the story that he was alive."

Last summer, inflation finally caught up with Mr. Howard's polar enterprises. He found he had to raise dues for the Polar Society from \$1 to \$2, the first increase since 1934, when the society was organized.

Plea to Members

Reluctantly, he sent out a plea to the society's 2,300 members scattered over 32 countries, asking for more money. Membership in the society entitles one to *The Polar Times*. As a bargain, he offered a three-year membership for \$5.

"The society's only sources of funds," he wrote to his fellow members, "are the dues and the sale of back issues of *The Polar Times*. You may wish to send the secretary \$5, \$10 or \$20 for 10, 20 or 40 back issues of

your choice. After you have enjoyed them you may wish to donate them to your favorite library. All back issues are 50 cents each."

The tabloid paper is made up of stories from newspapers, information from governmental agencies, with pictures and maps. Occasionally the paper prints pictures of postage stamps with polar themes. Mr. Howard is fond of stamps as well.

Indicative of the affection polar explorers have for Mr. Howard is the inscription to him by the late Paul Siple, in his book, "90° South." It reads:

"With best wishes to my good friend, August Howard, and admiration for your 25 years devotion to the American Polar Society and your many contributions to dissemination of polar information. Also for your long service to the Boy Scouts of America."

Boy Scout Work

The reference to the Boy Scouts stems from the fact that from 1928 until his retirement in 1970, he was public relations officer for the National Council of the Boy Scouts of America.

It was through the Boy Scouts that Mr. Howard's passion for polar subjects became a society and newspaper. In 1929, when Mr.

Firm Offers Polar Adventure For Hardy Few

Holmes & Narver, Inc. is now taking applications for several openings in support of the National Science Foundation's 1975-76 Antarctic programs. These positions offer rare opportunities for adventure in a land that can be considered no less than a frozen record book of time.

Some jobs will be for only the austral summer season -- September through February -- but several involve nominal one-year periods requiring wintering over in Antarctica.

Key positions to be filled include those listed below showing location and duration.

Winter Over

Station Manager (So. Pole and Palmer Sta.)

Station Engineer - heavy-duty equipment maintenance (McMurdo)

Physician (Palmer and Siple Sta.)
Paramedic (Siple Sta.)

Station Engineer - mechanical, electrical, structural (So. Pole Sta.)

Power Plant Mechanic - diesel (So. Pole Sta.)

Utilities Mechanic (So. Pole Sta.)

Communication Coordinator (So. Pole and Siple Sta.)

First Cook (So. Pole and Palmer)
Biology Lab Manager (McMurdo)

Austral Summer

Communication Technician (So. Pole)

Radio Technician (Palmer)

First Cook (McMurdo)

Biology Lab Manager (Palmer)

Qualified, physically fit applicants who are interested in new experiences and hard work may send a resume to:

Holmes & Narver, Inc.
400 East Orangethorpe Ave.
Anaheim, California 92801

Attention: William R. Frees

Siple was a Boy Scout, he was selected by Rear Admiral Byrd to accompany an expedition to the South Pole.

Mr. Howard, from radio reports on this expedition, organized a monthly newspaper called "The Little America Times," which he printed for a year and a half, sending copies to relatives and friends of those on the expedition.

The Polar Society was formed in 1934 and *The Polar Times* the following year.

PACK-ICE COULD NOT STOP HER

By
Harold F. Griffiths

A hundred years have gone by since the launching of the *Bear*, a robust wooden sailing ship at the Dundee yard of Alexander Stephen and Sons.

She was built to last. And that she did—90 years and some of the most rugged sea service imaginable.

Her first assignment was with a sealing fleet based in St Johns, Newfoundland and owned by Walter Grieve, of Greenock, Scotland. Her sister ships were *Wolf*, *Lion*, *Tiger*, and *Leopard*. All were lost in northern waters.

She was immensely strong as befitted the trade she was built for. Iron and steel had already found favour with many shipbuilders, but to withstand the pressure of Arctic ice only stout wood was good enough.

The shipyard crew bolted steel bed-plates to her ribs and keel, then lowered a boiler and engine into place. Her two-bladed propeller was installed on a hinged tail-shaft and could be hoisted above the surface for repairs if damaged by ice. It could also be stopped with the blades vertical in the wake of the keel and so offer little resistance to movement through the water when cruising under sail alone.

Her decks were made of teak and her sides above and below the water-line were sheathed with Australian iron-bark, the toughest wood known. Her bottom was covered with yellow pine coated with teredo worm-resistant copper paint.

Length of Norway pine, seasoned and polished, were stepped into her keel as fore- and mizzen-masts.

Shillings placed

Her main-mast, the tallest of the three, was a tube of hollow iron 127 feet high. Her workmen placed three shillings, heads up for luck, beneath the step of each mast to pay for the passage of her crew across the Styx in case she were lost at sea. Over the years they were to

prove her good-luck omen. She was rigged as a barkentine, that is, square rigged on the fore-mast and fore- and aft rigged on the main and mizzen masts. Her total sail area was 7,449 square feet.

Under favourable conditions, her steam engine could push her along at a speed of eight knots. Her overall length was 198 feet. Her figurehead was a white bear, as befitted her name.

Early years

As soon as she was launched, she was hurriedly fitted out and made all sail for St Johns, where she joined other Dundee sealers awaiting the start of the season. Among the hard-bitten skippers she did not excite much curiosity. She was just another new ship; she had yet to prove herself.

On March 10, the sailing date prescribed by Newfoundland law, the sealers cast off and headed for the sealing grounds off the coasts of Labrador and Greenland.

The bear had a successful first season and returned to St Johns with a hold packed with seal-pelts.

For the next 10 years, the *Bear* made annual trips with the Newfoundland sealing fleet and would probably have continued for many more years in this trade unless fate had not stepped in to alter the whole course of her career.

In 1881, the United States Army sent two exploring parties to the Arctic regions as the country's contribution to the chain of International Polar Stations. The 25-man expedition under Lieutenant A. W. Greely, working in the area to the extreme north of

Greenland, experienced trouble through the inability of supply ships to reach it. One relief ship was crushed in the ice.

Back in the United States it was realised, early in 1884, that Greely and his men were in grave danger of starvation, if indeed they were even still alive.

A rescue attempt was quickly organised, and when the *Bear* returned to St Johns from a routine overhaul at Greenock she found the United States Consul waiting to purchase her for the United States Navy.

Only St Johns sealers were considered good enough for rescue operations, as they were specially built for working in ice.

Walter Grieve had agreed to sell the *Bear* for \$100,000 and along with another sealer the *Thetis* and an ex-



The U.S. Revenue Cutter *Bear* off Barrow, Summer of 1898

ploration vessel the Alert, donated by the British Government, the three ships were speedily equipped and provisioned for two years. When they sailed northward in April, 1884, the Bear was no longer flying the British Ensign, but the Stars and Stripes. She was now the U.S.S. Bear.

There is not space to tell the full story of the rescue of Greely, but it is sufficient to say that the three ships, accompanied by several whalers, made all speed up the coast of Greenland. Each ship was anxious to be the first to reach the stricken party, but the Bear and the Thetis, because of their greater ability to manoeuvre in pack-ice, soon out-distanced their consorts. On June 24, 1884, they reached Cape Sabine on the coast of Ellesmere Island. Here, in a tattered tent without food and too weak even to speak, a party from the ships found Greely and the other five survivors of the expedition's original complement of 25 men.

One of the party, Sergeant David L. Brainard, subsequently promoted to Brigadier-General, survived until 1946, dying in his 89th year.

On his 80th birthday in 1936 this writer, as president of the newly-formed Dunedin branch of the New Zealand Antarctic Society had the pleasure of sending a telegram of congratulation to the general and receiving a gracious reply.

Because the Bear had proved herself so suitable for Arctic work, the United States Government decided to retain her and she was turned over to the Alaskan Patrol Service of the United States Revenue Marine, the forerunner of the present day United States Coastguard.

Coastguard duties

For the next 40 years, flying the flag of the U.S.R.M. the Bear, based in Seattle made annual voyages to the Bering Sea and around Point Barrow into the Beaufort Sea.

During this time she was the heroine of many mercy missions to starving Eskimo villages. Her doctor treated the sick and her officers married Eskimo couples on her quarterdeck. Her captain served as judge in trials of criminals and the crew suppressed more than one mutiny. She even landed the first reindeer in Alaska, transporting 12 of these animals from Siberia.

In the autumn of 1897, the Bear again made the headlines when she went on another mercy mission perhaps even greater than the rescue of Greely. In November of

that year eight whaling vessels were trapped in the ice off Point Barrow, and the 275 men of their crews were facing starvation. The Bear was ordered north and instructed to pick up a herd of reindeer on the way. She battled a passage through thickening ice, but was at last stopped 1,600 miles from the trapped ships.

And now began an amazing overland journey by three officers of the Bear's crew. Ahead of them lay a frozen wilderness and the rigours of an Arctic winter! Yet they purchased 450 reindeer from the Eskimo and under conditions of incredible hardship they struggled towards Point Barrow, driving their strange herd. Wolves killed some of the reindeer and others strayed away and were lost in snowstorms. Dogs and men became exhausted hauling their heavy sledges.

Their heroic journey ended on March 29, 1898, when they reached Barrow Village and found the stranded crews, dirty and hungry and in poor health but fortunately all alive. The reindeer herd provided meat until the Bear pushed through the ice and reached them in early summer.

During World War I the Bear was again in the navy, patrolling Alaskan waters. When hostilities ended she was returned to the Coastguards where she served until her de-commissioning in 1929. Though still sound, she was getting old. In that year she was sold to the City of Oakland, California, as a floating museum. But her career was by no means finished. Great achievements lay ahead of her.

Admiral Richard E. Byrd planning his second expedition to the Antarctic was looking for a stout wooden ship to serve as an exploration vessel in addition to his heavier steel supply ship, the Jacob Ruppert.

He heard of the Bear, inspected her at Oakland and bought her from that city for \$1,000, renaming her Bear of Oakland as a gracious gesture.

After she had been reconditioned, the Bear of Oakland, under the command of Lieutenant Robert A. J. English, sailed from Newport News on November 1, 1933 and reached Dunedin on January 13, 1934.

Many residents of this city will remember seeing this old ship and, like the writer, will have marvelled that a vessel so small should be prepared to tackle the stormy seas that lie between New Zealand and the Antarctic.

After taking on final stores, the Bear of Oakland

sailed on January 19 for the Bay of Whales on the Ross ice shelf, where Byrd had established his base. Little America, on his first expedition.

For all her years, the old ship made a fast passage, taking only 12 days for the journey of 2,300 miles.

A major objective of the expedition was the delineation of the coast of Marie Byrd Land, discovered by Byrd on his previous expedition.

Because of her stout construction, the Bear was admirably suited to working in heavy ice. During the next few weeks she was busily engaged in coastal exploration and late in the season she made a rendezvous with the British Oceanographic vessel, the Discovery II, north of the pack-ice to transfer a relief physician from New Zealand, Dr Louis Potaka, and transport him to Little America. On March 12, 1934, she was back in Dunedin where she wintered.

After reconditioning, the Bear left Dunedin on January 2, 1935, to assist her consort, the Jacob Ruppert, to evacuate the members of the expedition. She was back again on February 20 from whence she sailed for the United States.

South again

But the Bear was to have one more Antarctic sortie. In 1939, Admiral Byrd used her once again as one of the two ships of his third expedition, which was this time under the auspices of the United States Government. The Bear was chartered by the navy for one dollar a year and commissioned U.S.S. Bear. To give her additional power, her old steam engine was replaced by a diesel motor.

This time she did not call at Dunedin on her way south, but sailed direct from Boston to the Bay of Whales, where she arrived January 14, 1940.

After assisting with the establishment of what was called West Base, the Bear proceeded around the coastlines eastwards. Her new diesel engines enabled her to thrust further into the ice and a Barkley-Grow seaplane was used for reconnaissance flights inland.

In all, about 700 miles of new coastline were added to the map of Antarctica.

At Stonington Island, near the bottom of the Antarctic Peninsula, a second base was established and named East Base. From here the Bear returned home, but in January, 1941, she made a brief call at Dunedin on her way south to evacuate personnel at West Base.

This was the last time Dunedin was to see the famous old ship. When she sailed it

was to make a fast nine-day run to Little America, where with her consort, the North Star, she picked up the wintering-over party. From West Base the two ships proceeded round the continent to East Base and the Bear was back in Boston on May 18.

With the war getting close to American shores, the Bear returned to her old job as a Coastguard ship on Greenland patrol. There she assisted in the capture of the Norwegian freighter, the Buskoe. The Buskoe had been carrying radio supplies to a Nazi transmitting station on the Greenland coast.

In 1944, the Bear was de-commissioned and for a while she did a stretch "on the beach". She was eventually sold by the Maritime Commission to a Canadian shipping group who intended to convert her to her former role of sealer. But the price of seal oil and seal skins dropped and the venture fell through.

It now looked as if the old ship was destined to end her days on a Nova Scotia beach. Eventually, she was bought by a group of Pennsylvania philanthropists, who planned to preserve her as a restaurant and museum.

But the Bear was saved from this final ignominy. While under tow from Halifax, she ran into heavy weather. The tow line parted, and on March 19, 1963, the Bear foundered 260 miles east of Boston.

Let Admiral George Dufek, who sailed on her as navigator during Admiral Byrd's 1933-35 expedition, have the last word, "The Bear lies on the bottom of the sea in the Atlantic Ocean. But to those of us who served in her, she still sails under full canvas like a phantom ship in the mists of yesterday".

Fatal Attack by A Polar Bear

Inuvik, Northwest Territories

A man working at an oil exploration site in the MacKenzie delta was mauled to death by a polar bear Sunday, police said yesterday.

Police said Richard Pernitzky, 18, was attacked by the bear while working outside a building at an oil exploration site 200 miles north of here. Jan. 8 (Reuters)

Third SCAR/IUBS biology symposium: "adaptations within antarctic ecosystems"

W. TIMOTHY HUSHEN
*Committee on Polar Research
National Academy of Sciences
National Research Council
Washington, D.C. 20418*

The Third Symposium on Antarctic Biology, co-sponsored by the Scientific Committee on Antarctic Research (SCAR) and the International Union of Biological Sciences (IUBS), was held in Washington, D.C., August 26 through 30, 1974. The symposium's theme was "adaptations within antarctic ecosystems."

Representatives from the 12 SCAR nations (Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union, the United Kingdom, and the United States) and invited speakers from Canada and the Food and Agriculture Organization presented 76 papers (including seven invited review papers). About 200 scientists and observers participated in the symposium's nine sessions.

The first antarctic biology symposium (Paris, France, 1962) included papers on microbiology, plant and animal biogeography, ecology, and physiology, and human physiology and psychology. The second symposium (Cambridge, England, 1968) was on antarctic ecology; the papers covered all aspects of antarctic biology except human physiology and psychology.

The third antarctic biology symposium's general theme reflected a change in antarctic biological research: instead of reconnaissance and descriptive ecology, emphasis now is on quantitative ecology, resource management, and population, behavioral, and physiological studies. This new emphasis is aimed at understanding how antarctic organisms adapt to their individual ecosystems, and at elucidating the energy and nutrient cycles of selected ecosystems.

The symposium's general theme was organized into four subthemes representing major areas of recent biological research. The subthemes were: (1) structure and function of marine ecosystems; (2) structure and function of freshwater and terrestrial ecosystems; (3) development and evolution of antarctic ecosystems; (4) ecosystem evaluation, modeling, monitoring, and management.

In his opening remarks, George A. Knox, convenor of the symposium and chairman of the SCAR biology

working group, stressed that antarctic biology, having reached a crucial stage, will become increasingly important during the next 10 years.

"There's no doubt that we will see increasing exploitation of antarctic resources; not only living resources of the antarctic oceans, fish and krill in particular, but . . . the exploitation of mineral resources," Professor Knox said. "This will pose considerable problems in antarctic conservation, and antarctic biologists will be deeply involved in seeking answers and in providing knowledge that will be necessary in order to avoid any unnecessary damage to the resources of the Antarctic."

Subtheme I: structure and function of marine ecosystems. This subtheme dominated five of nine symposium sessions, thus reflecting today's marine ecosystems emphasis in antarctic biological research. Joel W. Hedgpeth, Oregon State University, provided an overview for this subtheme in his paper entitled "antarctic marine ecosystems." Other papers in the first session were on factors controlling primary production, distribution and significance of vitamins in antarctic waters, phytoplankton biomass and productivity, and heterotrophic potentials of microorganisms.

Patrick M. Arnaud, Station Marine D'Endoume et Centre d'Océanographie (France), in session 2 presented an invited paper on "some ecological comparisons between antarctic and subantarctic marine benthic communities." The marine benthic community was examined further by contributed papers on feeding characteristics of asteroids, population variations in benthic organisms, diversities of benthic annelid populations, and densities of soft-bottom meiofauna in response to the antarctic marine environment.

Bruce L. Umminger, University of Cincinnati, prefaced sessions 3 and 4 with his invited paper on "mechanisms of cold adaptations in polar marine animals." Eleven contributed papers examined specific adaptations of fishes and birds to the antarctic marine environment. Studies of antarctic fishes discussed the

physiology of colorless blood, respiratory and circulatory adaptation to the absence of hemoglobin, and the role of glycoprotein as an antifreeze agent.

Studies of antarctic birds concerned the dynamics of microflora in digestive tracts, the osmo- and thermoregulatory responses of penguins, the body temperature regulations of emperor penguins, and the cardiovascular adaptations of giant petrels. Other studies concentrated on the behavior adaptations Adélie penguins, rockhopper penguins, south polar skuas, and arctic and antarctic terns have made to the Antarctic.

Richard M. Laws, British Antarctic Survey, delivered a paper on "the significance of vertebrates in the antarctic marine ecosystem," which provided the background for session 5. Contributed papers discussed the behavior, the life history, and the special environmental adaptations of antarctic tooth whales, leopard seals, and young Weddell seals. Other papers examined the development of temperature regulation in seals, the status of pelagic seals in pack ice, and the food consumption of seals.

Subtheme II: structure and function of freshwater and terrestrial ecosystems. R. Barry Heywood, British Antarctic Survey, gave an invited paper on "antarctic freshwater ecosystems." His paper reviewed the current status of limnological knowledge of freshwater ecosystems. Other papers in this session examined production, periodicity, and the availability of nutrients in the antarctic freshwater environment.

Specific adaptations to terrestrial ecosystems were explored by comparing climatic relationships among moss populations, measurement and prediction of net annual production, and reproduction and adaptive strategies of subantarctic grasses. Other papers analyzed seed germination, energy flow through moss communities, and adaptations of panantarctic mites to the antarctic terrestrial environment.

Subtheme III: development and evolution of antarctic ecosystems. In his invited paper on "the evolution of polar ecosystems," Max J. Dunbar, McGill University (Canada), discussed recent advances in research on the paleoecology of marine and terrestrial ecosystems and traced the development and evolution of antarctic ecosystems. Contributed papers in sessions 7 and 8 examined the evidence of ancient precursors of the modern ecosystem, the evolution of the Kar Plateau ecosystem, and the distribution and evolution of polychaete fauna. Other papers traced the antarctic ecosystem development by means of fish species distribution, the ecological adaptations of animal parasites, and the paleoecology of marine microplankton flora.



U.S. Navy

Subtheme IV: ecosystems evaluation, modeling, monitoring, and management. John A. Gulland, Food and Agriculture Organization, presented an invited paper on "the management of antarctic living resources," which opened session 9. Other papers examined the effects of pollution and human activity on the structure and function of antarctic ecosystems. Reports were given on the management of krill as a renewable resource, the environmental impact studies of antarctic research sites, and the competitive and adaptive responses of invading versus indigenous biotas in the Antarctic. Other contributions discussed mathematical models of benthic and planktonic communities, effects of human disturbance on penguins, and adaptations of cattle to the subantarctic.

Professor Knox closed the symposium by asking scientists to view antarctic ecosystems in a global context. He observed that antarctic ecosystems are sensitive to worldwide influences.

The symposium proceedings volume is being edited by George A. Llano, National Science Foundation. Scheduled for publication later in 1975, the proceedings will be issued by the Scientific Committee on Antarctic Research, Scott Polar Research Institute, Cambridge, England.

Environmental Science in Antarctica— Global Pollution Benchmark

Richard D. Fortner and Barron L. Weand

TO MANY people Antarctica is a cold, isolated, and barren continent—the home of penguins and little else. It is also the world's greatest reservoir of fresh water. The Antarctic ice cap, which is up to 3.5 kilometers thick, comprises more than 90 percent of the world's fresh water. It is estimated that if this ice were to melt, the average level of the oceans would rise 60 meters, inundating such major coastal cities as New York, Los Angeles, Tokyo, Barcelona, and Marseilles. Furthermore, this water is of such purity that Antarctic icebergs have been seriously suggested as a drinking water supply for arid regions such as southern California and Australia.

Perhaps more important than its potential water supply is Antarctica's potential as a vast natural laboratory where scientists from around the world conduct research in such diverse fields as biology, geology, atmospheric physics, and even water pollution. For the past two years Lake Bonney, an Antarctic lake in Taylor Valley of southern Victoria Land, has been the subject of re-

search by the authors and co-workers from Virginia Polytechnic Institute and State University. Many people, upon learning this, ask if the Antarctic is actually polluted. No, not in the usual sense, but man's impact on this remote environment is becoming increasingly evident.

Antarctica may be unique as a global pollution benchmark. This vast continent far from industrialized civilization has yielded some disturbing facts to scientists. DDT has been found in the tissues of penguins and other Antarctic birds. Lead has been detected in cores of ice from near the South Pole. In fact, the period since World War II shows a significant increase in the lead content of snow and ice cores taken from the cleanest, least contaminated sites available. Thus the frozen continent may serve as a monitor of air and water pollution

Mr. Fortner and Mr. Weand are graduate research assistants in the Department of Civil Engineering at the Virginia Polytechnic Institute and State University at Blacksburg. They are working on PhD degrees in Environmental Sciences and Engineering with emphasis on water pollution. Both are former high school science teachers who have been to Antarctica twice while working on their advanced degrees.

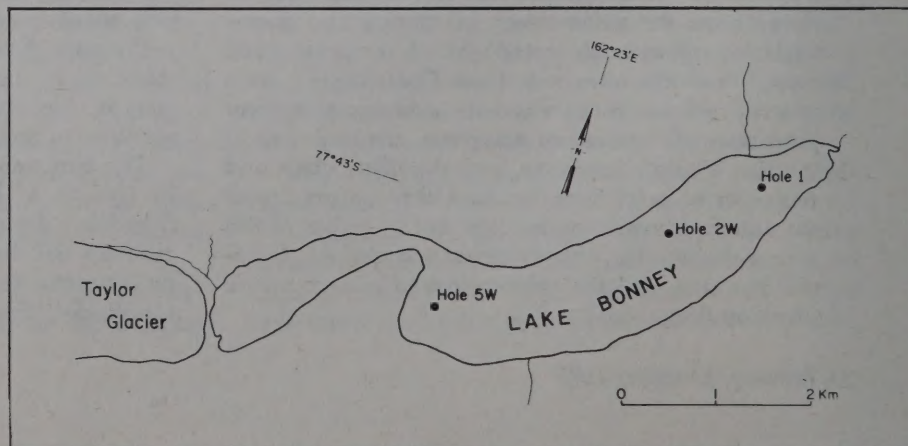


PHOTO BY B. WEAND

U.S. Navy helicopter carrying lab and camp wastes back to McMurdo Station, Antarctica, for disposal. Great care is taken to not pollute the lake.

in such a way as no other site can, for pollution here represents truly global pollution and not just localized perturbations.

Our own efforts in the Antarctic have involved basic research into ecosystem dynamics. The goal of the research is to model mathematically one or more Antarctic ecosystems. Lake Bonney is nearly ideal for such studies because of its simplicity. Whereas geneticists have had their fruit flies and physiologists their white mice, ecologists have not had many simple yet natural ecosystems to study. Their approach has been to simplify relatively complex systems or to work with arti-



ficial systems that may simulate the natural conditions. We hope to develop a thorough understanding of an entire ecosystem by studying a relatively simple system.

Lake Bonney is one of the few lakes on earth that has not been influenced by man's polluting activities. It has been known as a lake for less than 15 years, for it was only in 1960 that Armitage and House drilled the first hole through its ice and discovered water. Since then there has been much scientific interest in this unique lake. Its pristine condition and ecological simplicity (there are only microscopic life forms and a two-level food chain in the lake) have caused scientists to refer to Lake Bonney as "the ideal microcosm for ecological research." This lake represents a nearly closed ecosystem. It is fed only by glacial meltwater for four to six weeks per year and perhaps subterranean springs. There is a permanent ice cover of approximately 3.5 meters, with only a small moat area of the lake becoming ice free during the austral summer. It is meromictic, i.e., it does not mix from top to bottom as do most temperate lakes.

The stratification of the lake waters is due primarily to increasing

salinity with depth. Although the surface waters are fresh (they are the drinking water for the field camp), the bottom depths have a salt concentration of about five times that of seawater. The bottom itself (30 to 34 meters) has a layer of pure halite (sodium chloride) nearly 10 centimeters deep that has been proposed as a possible Antarctic mineral resource. This use seems unlikely, however, because of problems with logistics.

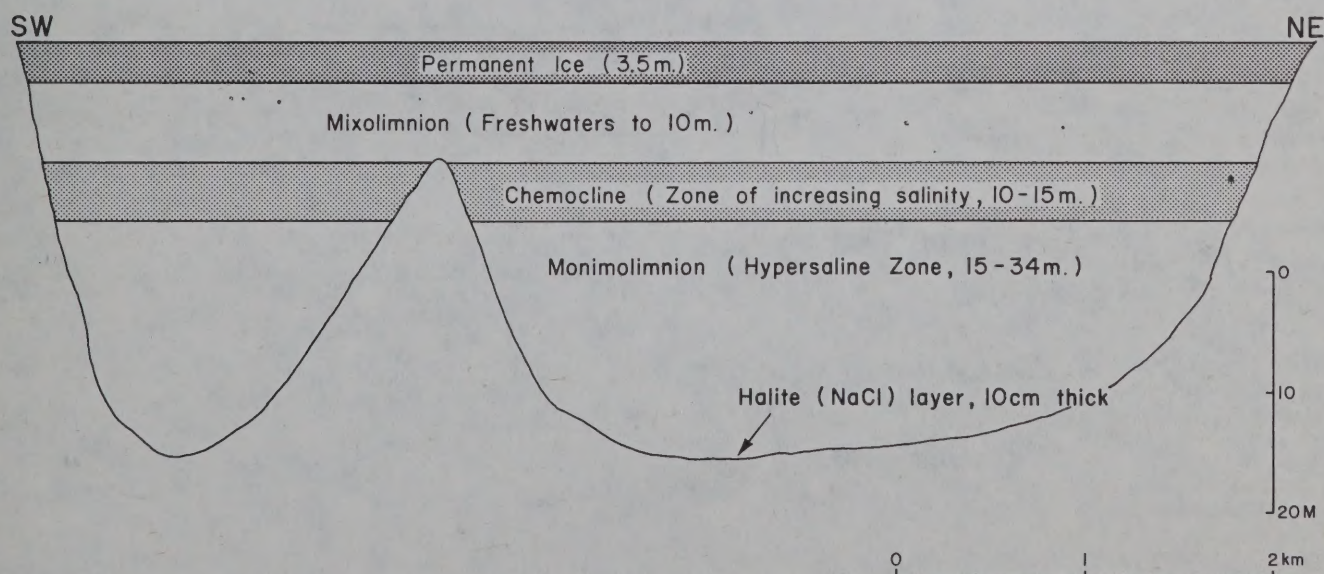
Our studies to date have been concentrated on the water column community (algae, bacteria, and yeasts are the only organisms present) and the benthic algal mat communities which grow prolifically in certain regions of the lake. We have monitored community metabolism and chemical variations in the lake waters in order to obtain baseline information. These data have been programmed into a computer and are the basis for developing a mathematical model of the lake ecosystem. Once the model is perfected it will be useful in predicting the effects of possible changes in the lake as a result of disturbances such as pollution. In fact it is hoped that the computer will be able to simulate the lake ecosystem so that the effects on this and other, more com-

plex lakes can be determined without destroying the value of the lake as a scientific resource.

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A profile of Lake Bonney showing the permanent ice layer and the distinguishable layers of water of differing salinity.



PHOTOS BY JAMES CRAFT

Upper photograph. Sampling station on Lake Bonney. Taylor Glacier is in the background.

Lower photograph. Lake Bonney, showing the rough permanent ice and a sampling station. Note the "dry valley" in the background. The area is ice free the year around. The diagram on the opposite page also shows the lake in relation to Taylor Glacier.